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NEWSPAPER

A Multitusking Task

Univac customer engineer checks electronic equipment to be used by an October expedition reenacting Hannibal's crossing of the Alps with elephants in 218 B.C. The project is being conducted to gather information on the animals' resistance to cold, altitude and fatigue.

The elephants will have multichannel telemetry devices strapped to their hearts to detect heartbeats, body temperatures and brain activity. The data will be processed on a Univac 90/30 system.

Protects Federal, EFT Systems

Senate Gets First DP Crime Bill

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. — The first piece of legislation aimed specifically at computer crime was introduced in the Senate here last week.

The bill would make it a crime to misuse the computer systems of the federal government, certain financial institutions and other entities involved in interstate commerce.

Punishment for violators of the proposed law would be a jail term of up to 15 years and/or fines up to $50,000.

The legislation's sponsor, Sen. Abraham Ribicoff (D-Conn.), attaches "great importance" to the penalty portion of the bill.

"Computer criminals are the most sophisticated of all white-collar criminals," Ribicoff said. "They currently operate in an environment and under conditions in which the successful detection and prosecution of their crimes is very difficult.

"When they are apprehended and convicted, all too often the sentences they receive are extraordinarily light," he added.

It is Ribicoff's hope "that these increased penalties, unprecedented in federal criminal law for white-collar crime, will deter the potential computer thief and at the same time pose a warning to all white-collar criminals that Congress sees white-collar crime as a threat to our society which should be dealt with in a manner befitting the crime."

EFT Protection

The bill also places emphasis on the prosecution of crimes against the computer systems of banks and other financial institutions that are insured or regulated by the federal government. The growth of electronic funds transfer (EFT) systems requires special protection because they are particularly vulnerable to criminal attack, Ribicoff said.

The proposal would guard against unauthorized access:

- To customer accounts by means of the theft or reproduction of an access key.
- To accounts by personnel manning access terminals.
- To communications lines between remote terminals and information storage areas.
- To the central processing site.

Existing laws are inadequate for prosecuting computer criminals, according to Ribicoff.

While there are some 40 sections under Title 18 of the U.S. Code that the government can apply to combat computer-related crime, all 40 were written for other types of crimes, he pointed out. Consequently, federal prosecutors have to "shoe horn their cases into already existing laws ... that did not envision the technical aspects of such crimes," he said.

The bill is a result of an inquiry begun May 10, 1976 by the Senate Governmental Affairs Committee, of which Ribicoff is chairman.

A staff report released Feb. 2 entitled "Computer Security in Federal Programs" demonstrated the government's inability to secure its 10,000 computers, discussed weaknesses in government procedures for predicting the integrity of its computer personnel and showed concern on the part of the federal law enforcement officials that the U.S. Code should be amended to strengthen the government's ability to prosecute computer crime.

It was noted in the report that a major computer crime conviction had been won in one case only because the perpetrator had used a telephone line to penetrate the computer system of a federal contractor across state lines. Had the telephone been used intrastate rather than interstate, the Wire Fraud Statute under which the indictment was brought could have been inadequate, federal prosecutors said.

In the same case, a part of the indictment was dismissed because electromagnetic impulses which transmitted data were determined not to be "property" as defined in the Interstate Transportation to Stolen Property Statute, Ribicoff said.

Ribicoff's bill would make all penetrations a federal crime, not just those acts perpetrated with a telephone or by other means across state lines.

Cosponsors of the Ribicoff bill include Senators Charles Percy (R-Ill.), Henry Jackson (D-Wash.), Lee Metcalf (D-Mont.), Edward Kennedy (D-Mass.), Strom Thurmond (R-S.C.), Robert Griffin (R-Mich.) and Pete Domenici (R-N.M.).

For Software Programs

Contu Unit Says Copyright Enough

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — "The copyright law, applying as it does to all forms of expression, should be broad enough to shelter the works of Nobel laureates and computer programmers without causing any confusion about which is which."

With those words as the final sentence in its report to the National Commission on New Technological Uses of Copyrighted Works (Contu), the commission's software subcommittee left no doubt as to its basic belief.

Established by Congress late in 1974, Contu was chartered to study, among other things, the reproduction and use of copyrighted works on DP systems and to recommend changes in the law that seem necessary because of the use of such systems. The commission is releasing this report now for public comment.

The dramatic quality of the software subcommittee's words was triggered, perhaps, by the subcommittee's desire to overcome resistance to the idea it sensed on the part of the commission. A footnote early in the report claimed "certain commissioners are skeptical about the need for any form of protection for computer programs as well as the copyrightability of such works."

No such concerns face a subcommittee on computer-based data bases. The discussion in its report to Contu, also just released, "is premised upon the commission's agreement with the legislative intent of the new copyright law to afford copyright protection for computer data bases equivalent with the protection accorded compilations in traditional hard copy format," the committee said.

Between the footnote and the dramatic ending of the software report, the committee argued that authors of computer programs clearly have a right to protection for their work, that various other forms of protection — particularly patents and trade secrets — are not appropriate for software and that parts of the new copyright law scheduled to go into effect next year should be

(Continued on Page 4)

Management Key to Future DP: Spangle

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — Management issues are more significant than technological concerns in improving the efficiency of DP activities during the evolution to advanced computer systems, C.W. (Clancy) Spangle said here last week.

"Those responsible for implementing tomorrow's systems must be concerned with the overall efficiency of the installation in an organization ... and how this is perceived by the organization," Spangle, president of Honeywell Information Systems, Inc., told attendees of the National Conference on Computer Systems Productivity.

"All of us in the profession need to do a much better job in reviewing and explaining the cost-effectiveness of our present systems. If we don't do a better job with today's systems, there won't be any tomorrow," he warned.

Spangle acknowledged that defining tomorrow's systems "is not an easy task because of the speed at which technology appears to be changing and because there seems to be some divergence of opinion within the industry as to what tomorrow's standards will be."

"Nevertheless," Spangle said, "I believe we can agree that the industry is moving more and more toward bringing the power and the variety of functions that a computer can accomplish out of the machine room and into a workstation where the transactional activity and the business actually takes place — thus making the power of the computer available to ordinary employees instead of just the computer professional."

The goal of these advanced systems "is to achieve increased individual productivity," he observed. But he noted, moving to these new systems can be accomplished only if the task is treated as a management issue rather than a technological one.

(Continued on Page 2)

Senate Strikes 'Target'

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — The Senate has voted to kill funds for the Veterans Administration's (VA) controversial computer claims processing system known as "Target."

About $17 million of the $21.9 million 1978 appropriation was struck by the Senate Appropriations Committee's Subcommittee on Housing and Urban Development — Independent Agencies chaired by Sen. William Proxmire (D-Wis.).

The $4,927,000 that remains will be used to continue the pilot project now under way in Philadelphia.

The computer system was proposed for use in servicing the files of 7 million VA beneficiaries who receive monthly benefits, pensions and

(Continued on Page 4)

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To Mitigate Confusion

Societies Urged as Vendor-Victim Liaison

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — The professional DP organizations must become a truly effective "third force" to bridge the gap between the "vendors and the victims" of the uncontrolled growth of DP in this country, according to Dr. Herbert R.J. Grosch, president of the Association for Computing Machinery (ACM).

Unless the organizations step in effectively, the confusion of the DP community and the disappointments of the end users will continue to grow, Grosch warned attendees at the National Conference on Computer Systems Productivity here last week.

This leads not only to poor systems, but to such things as the "meaningless layers of software" including complex operating systems and "portable, high-level languages" now being implemented on minicomputers, he added.

Even though they often have limited resources, ACM and the other organizations that make up the American Federation of Information Processing Societies (Afips) must handle the dual job of advising users of what they might reasonably expect from systems and of helping vendors understand what the users need.

Only these groups are "intellectually free" enough to do the job, Grosch said.

User groups seem to fit into the gap between vendor and user, he admitted, but "they are often very vendor-oriented, on the one hand, and very concerned about the technical aspects of the products, on the other." They just aren't focusing on the bigger issues, he said.

Vendors don't really care about the users' desire and need for good systems. It is abundantly clear that various vendors have "suborned" the potential effectiveness of an original system to sell more powerful equipment, he charged.

Hope in Sight

But there is hope. Afips has recently opened a Washington office and, even though it's a small operation now, it's a start, Grosch noted.

It is a place where users can come for objective information and a place from which the professional DPers can perhaps make their views known to government policy makers, he said.

The organizations also have to reach out the other way, however, and get more DPers involved in their operations, according to Grosch.

ACM, he noted, has reached a membership of 35,000 and others generally are smaller. Overall, they now influence a very small fraction of the people really involved in DP in this country.

To broaden interest in their purposes, the organizations must, for example, make their publications more readable or create new publications for a wider audience.

In line with that thought, Grosch noted a feasibility study is now underway that may lead to the publishing by Afips of a "general interest" DP-oriented magazine called *Abacus* with funding from ACM.

The problems of the end users are perhaps illustrated best by the proliferation of "minis, micros and terminals" throughout the halls of Congress, Grosch said. The expectation seemed realistic — to tap information in the Library of Congress and the data bases available to the congressmen.

In practice, however, the users — congressmen and their staffers — struggle hard to learn how the systems work, after which they get "unformatted data from incompatible files, which they have to analyze themselves to get the information they wanted in the first place," according to the ACM leader.

FTC to Probe Credit Bureaus

WASHINGTON, D.C. — The Federal Trade Commission (FTC) has launched an investigation of computerized credit bureaus to determine if the information they maintain on consumers is accurate.

"The inquiry will seek to determine whether the bureaus are maintaining reasonable procedures to assure accuracy of information as required by the Fair Credit Reporting Act," the FTC said in a news release.

The agency refused to indicate which credit bureaus were under investigation, but noted the inquiry would be limited to "automated" bureaus.

"On the basis of information obtained, the commission will determine whether further action to enforce the Fair Credit Reporting Act on a nationwide basis is necessary," the FTC said.

A spokesman said the investigation was being brought as a result of complaints filed by individual consumers. The probe is expected to take six months to a year.

Depending on the extent of violations, if any, the FTC can make a public complaint against an individual company, propose a standard for operation or report to Congress with proposed legislation, the spokesman explained.

Management Key to Future DP

(Continued from Page 1)

Many users today have a very high-speed, powerful, latest generation computer which is not being used efficiently because it's doing exactly what was done in the past with the old machine, Spangle observed.

"On too many occasions people just do a surface conversion, don't use the new capability and continue running a big batch workload on a highly terminal-oriented interactive system that just doesn't run a batch workload as well as the old system," the executive said.

"Data processing technology already is far in advance of what is being realistically used and tapped. The very real problems are organizational, operational, logistical, human and political — in short, management issues," he emphasized.

Spangle said the real key to the success of tomorrow's computer system is in the quality of thought that goes into its design, installation and implementation, the level of receptivity that is created for it, and the degree of familiarity achieved by both the people who operate the system and the customers it serves.

Old-Fashioned But Good

Some of the old-fashioned solutions to management problems still are valuable in the most modern systems. Nothing beats proper training including — or perhaps starting with — training from vendors, Spangle said.

"But don't fall into the trap of thinking you can get all the training you need from vendors," he cautioned. "They won't tell you anything about your internal applications, your own workload that's on the machines or your own procedures.

"Remember that there is a body of training and documentation that you must do for yourself — and if it's not done properly the system will come down or be used inefficiently," he advised.

"It comes back to the premise that management of a data processing system is a process, not an event — it is always being tuned and improved," Spangle said.

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SWEEPSTAKES

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* * *

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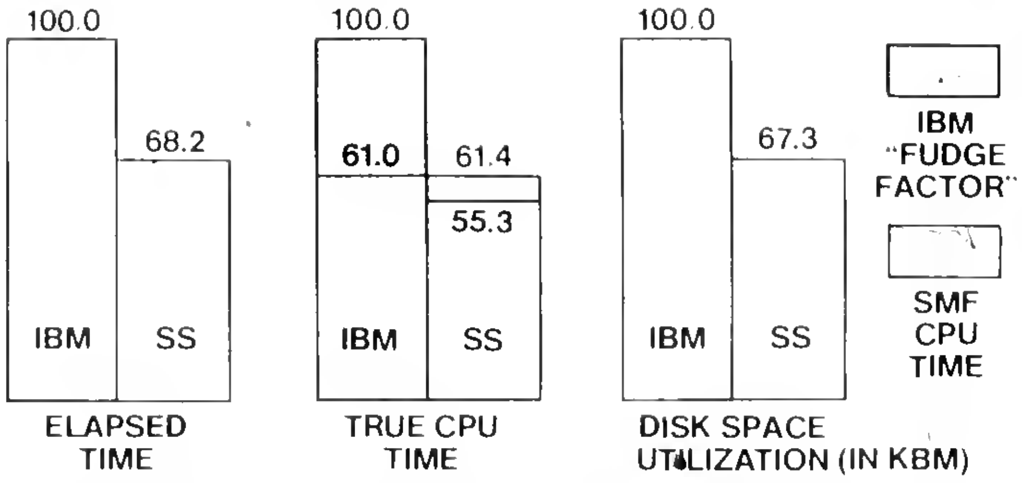

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Author Hersey Says Copyrights Meant for Art, Not Technology

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — Computer programs should not be protected by copyrights, according to well-known author John Hersey, who disagreed with the majority of software subcommittee members of the National Commission on New Technological Uses of Copyrighted Works (Contu).

In a long paper distributed with the software committee's report, Hersey, a Contu member, questioned whether programs qualify as "works of authorship" and argued that protecting programs by copyright might have an undesirable impact on the national culture.

Hersey urged Contu to consider whether any additional protection for programs is needed. If it is, he asked the 12-member commission to consider a new form of protection outside copyright. A draft of a model statute, expressing that option, is attached to Hersey's dissertation.

In the body of his essay, Hersey stated emphatically, "Programs are different from the various forms of 'works of authorship' secured under the constitution by copyright."

Each program may be considered a writing of an author up to a certain point in its development, he acknowledged, but "beyond that point the same program is embodied in material form and becomes a *mechanical device*, which is engaged in the computer to become an essential part of a mechanical process.

"Thus the computer program is something strikingly new in our culture," he said, adding later that 'every program has but one purpose and use ... to control the electrical impulses of a computer in such a particular way as to carry out a prescribed task or operation. In its object form it does not describe or give directions for mechanical work. It does the work.

"A true writing has never before done work in this way — no matter how fervently many an author may have wished his words could 'do' something," he said.

Even if the first stages in the life of a program, when it is often in human-readable form, might be considered copyrightable without any change in the present law, the "working" stages cannot be granted that protection. That would preclude the possibility of copyrighting the whole, Hersey argued further.

Cultural Concerns

Moving to cultural concerns, the author noted the commission's view that "the dual purposes of copyright are the encouragement of creative work and the wide scattering of its fruits.

"The sanctioning of copyright protection for this new thing ... would, in this view, tend to dampen the first purpose. Its impact on the creative community would be bound to be discouraging ... this pollution of copyrighted 'writings' with units of mechanical work would affect not only the creators but also the consumers of the culture.

"The distinction is not between Nobel laureates and computer programmers [as the software subcommittee suggested in its report] ... it goes to the distinction between human beings and machines," he added later.

The draft statute provided by Hersey differs from copyright in one essential respect: It is drawn specifically to protect both the expression and the innovative ideas involved in the creation of computer programs, he explained. It establishes, he said, a "reserved territory" between copyright and patent, which has aspects of both but is neither.

The Hersey draft calls for a protection period of 10 years, which he said is "far more suitable for computer programs than the much longer term of protection of the copyright law. The 10-year term would give the innovator an edge without being so long as to deny the public the cumulative worth of the knowledge involved."

The draft includes the means by which rules can be adapted to the changes in technologies for operating computers "which are bound to have more far-reaching and wrenching consequences" than changes in the technologies of conventional copyrighted works, Hersey said.

Contu Asks Comments

WASHINGTON, D.C. — In publishing the reports of its subcommittees on data bases and on software (see Page 1), the National Commission on New Technological Uses of Copyrighted Works (Contu) also asked for public comment on the documents.

The commission will base its final report to the President and Congress upon response to the documents it said, as well as on further public hearings and the results of "several" studies now in progress concerning the economic, public interest and consumer questions associated with the issues before the commission.

Copies of the reports are available free from the commission. Request and comments on the reports — due by Sept. 1 — should be addressed to Arthur J. Levine, Executive Director, National Commission on New Technological Uses of Copyrighted Works, Washington, D.C. 20558.

The subcommittee reports were also published in the June 23 issue of the *Patent, Trademark and Copyright Journal*. Reprints are available for $5 from the Bureau of National Affairs, Research and Special Projects Division, 1231 25th St. N.W., Washington, D.C. 20037.

Unit Calls Copyrights Enough

(Continued from Page 1)

altered to clear up technical difficulties related to software.

Changes in the law are needed because of the way in which progams are used. Loading or inputting a program into a computer constitutes making a copy and, under present working of the law, copying is the exclusive right of the copyright owner.

One part of a new section of the law proposed by the subcommittee is designed to make it clear that inputting a program by a rightful possessor is not an infringement. Another part permits a user to make a copy of a program as backup protection in case something happens to the original copy.

But the subcommittee is aware of limitations in the protection provided by copyrighting even if the suggested changes are made in the law.

"It should be emphasized that the protection which would be afforded programs by copyright would not serve to block the use of a program's basic concepts by others since copyright never protects ideas, but only the expression thereof," it said.

Further, "when specific computer instructions, even though previously copyrighted, are the only and essential means of accomplishing a given task, their later use by another will not amount to an infringement," the report contended, citing a court decision related to use of a lawyer's copyrighted language as analogous.

Copyright protection for programs would "indeed be 'thin,'" the subcommitte acknowledged, "because in the programming field the use of specific language — instructions — may, in some instances, be so basic, essential and integrated with the underlying idea that use of the same language [by someone else] would not constitute infringement."

Although most programs have shorter useful lives than the full term provided by the copyright law — 75 years — there is no need to treat software as unique in this respect. "No one is harmed when short-lived works remain protected beyond their brief periods of utility," the report said.

Getting down to details, the subcommittee recommended that notice, deposit and registration regulations be promulgated by the Register of Copyrights. The fact that programs tend to be updated more frequently than other copyrighted material may lead to changes in the normal "deposit" rules, but these should be relatively minor, the software report added.

In its report, the data base subcommittee also faced the question of how the copyright law could be implemented with respect to big and ever-changing data files. Again, the answer seemed to be that the law as it stands could handle the job fairly well.

Largely because of the constant change inherent in computerized data bases, the group urged the Register of Copyright to work out rules that would allow the deposit of the complete data base at the time of original copyrighting, but permit updating through submission of "identifying material" rather than actual copies of the "new" data base.

Funding for Target Voted Down

(Continued from Page 1)

education payments.

When fully operational, the $122 million proposed system will comprise a central computer system and three regional centers as well as 79 minicomputers and 2,500 terminals spread throughout the VA's local offices [CW, May 2].

Despite the Senate action, all or part of the funds may be restored in conference between members of the House of Representatives and Senate when they convene the week of July 11, according to a Senate spokesman, since the House earlier approved the full request. The measure was defeated for a number of reasons, he noted.

First, the benefit/cost ratio got worse and worse, the spokesman said. For every $1 spent, only $1.19 would be saved, according to the VA's projections and then only as long as the VA stayed on its implementation schedule.

Secondly, the size of the project seemed "unduly large" since the workload of the system continues to decline, particularly in the area of Veteran's educational benefits.

Further, at the time the Senate acted, the VA still hadn't developed a comprehensive plan that identified all the critical tasks to be accomplished under the project, he said. The VA "rushed up" a critical tasks list at the last minute, but its effort came too late for consideration, he indicated.

The VA is "hopeful" that funds will be restored in conference, according to Bill Martin, under whose department the proposed system would be operated.

"However, if the Senate vote prevails, Target is effectively destroyed because the request for proposal would have to be withdrawn and we'll have to go through the entire [procurement] cycle again," Martin, chief data management director, said.

Martin said the VA has responded to a General Accounting Office report that was critical of several aspects of the Target system's development, in a report that has yet to be officially released.

"I think we have adequately dealt with all those issues raised," he added.

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Windy City Programmer Wins Code-Off in Big D

By Nancy French
Of the CW Staff

DALLAS — A Chicago man topped the field of 47 entries in the first "programming tournament" held here recently in conjunction with the National Computer Conference.

The contestants in the four-round affair included high school and college students, but most were entrants drawn from the ranks of professional programmers and were selected from 65 original entrants based on programs they had submitted.

First prize went to William T. Bailey, a programmer/analyst for Standard Oil of Indiana in Chicago. Second place went to Saul Rosenberg, a programmer and "general troubleshooter" for Riverside Research Institute of New York.

Third prize was won by Thomas M. Bogner, whose most recent job was instructor at Jamestown Community College in Jamestown, N.Y. The fourth prize winner was Bernard M. Chester, manager of computer resource OR/MS at Dialog, Inc. of New York.

Fifth place went to William A. Sherertz, chief systems programmer for Blue Cross/-Blue Shield of Michigan in Detroit.

Each of the four rounds was designed to test one particular programming skill, according to Ed Rodriguez, associate professor of computer science at East Texas State University, who, as NCC special activities chairman, ran the tournament.

In Round One, the 47 contestants who started were asked to complete a general multiway merge on the program each had written as contest entry so that it could handle duplicate keys. Contestants were allowed one hour to study the problem and two hours work on a terminal; 25 contestants were eliminated.

In Round Two, the 22 remaining contestants were asked to debug a data validation program containing logic errors. The same amount of time was given as in Round One.

In Round Three, the nine remaining contestants were asked to modify a program they had not written. The task was to generalize a poker hand evaluation program to permit any number of players and implement a discard and drawing new card feature. Again, one hour of study time and two hours of work time was allowed.

In Round Four, the six remaining contenders were asked to write a program from scratch — to produce frequency tables for cryptographic analysis of a coded message.

One hour of study time and three hours of work time was allowed.

The contest was run on the Dallas Independent School District's Time-Sharing Service, based on a Burroughs B6700. Terminals were donated by Computer Devices, Inc., Anderson Jacobson, Texas Instruments and Telex Corp.

As first prize winner, Bailey was awarded a TI Silent 700 Model 745 terminal, $500 worth of time-sharing services from Tymshare, Inc., a two-year subscription to *Personal Computing* magazine and a plaque commemorating the win.

Second prize winner Rosenberg won a Hazeltine Modular I CRT terminal and a one-year subscription to *Personal Computing* in addition to a plaque.

Third prize winner Boger won a Computer Automation, Inc. Naked Mini with LSI4/10, a one-year subscription to *Personal Computing* and a plaque.

Chester, as fourth prize winner, won an Informer Model D77 CRT terminal, a one-year *Personal Computing* subscription and a plaque.

For coming in fifth, Sherertz won Datapro Research Corp.'s three-volume Datapro 70 Information Service, the subscription to *Personal Computing* and a plaque.

Semifinalists won such prizes as a one-year subscription to *Computerworld*, NCC proceedings and a choice of books from Prentice Hall.

Two Univac Managers Accused of Using DP For Fraud, Conspiracy

PHILADELPHIA — Two program managers have been indicted for mail fraud and conspiracy while allegedly using computer time without the knowledge or consent of their employer, Univac.

David E. Kelly and Mathew Palmer Jr., the two charged with the crime, set up a music rearranging business last year, called Camps, Inc., and solicited nearly 70 companies for business.

The two programming managers allegedly used nearly $144,000 in computer time and storage from Univac facilities, the indictment charged.

Allegedly using a Univac 90, the two were able to revise music into digitized form, selectively edit the music and print out any desired format, according to a spokesman for the Federal Bureau of Investigation (FBI).

The men have been charged with five counts of mail fraud and one count of conspiracy.

Mail fraud is a common statute used in these cases, the FBI spokesman said. "It's a tried and true federal law whereas there is no specific state or federal law for computer cases."

The indictment stated nearly 417 music programs were stored using a CPU, terminals, operators and three-fourths of the allotted storage time given to Kelly's group. Univac would not comment on the case.

Both men are represented by J. Shane Creamer, former district attorney for Pennsylvania, and have pleaded "not guilty."

If convicted, each could be jailed for up to 30 years and fined up to $15,000. No trial date has been set.

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Al Muirhead Manager Systems
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Wisconsin Levies Software Tax Despite Revenue Overestimation

By Molly Upton
Of the CW Staff

MADISON, Wis. — Gov. Patrick J. Lucey last week signed into law a budget bill that levies a 4% sales tax on DP services, despite the fact the Wisconsin Department of Revenue overestimated by about 56% the revenue yield from such services.

The tax goes into effect Aug. 1.

Nick Nichols, deputy secretary of the Department of Revenue acknowledged in a memo to State Rep. Gary K. Johnson, cochairman of the Joint Committee on Finance, that the revised estimate of the revenue yield from the tax is $9.9 million rather than $17.5 million.

The overestimation, pointed out by Michael Zeidler, a computer consultant [CW, June 13], stemmed from including as a basis for revenue calculations the $3.7 billion in revenues state officials thought mainframers received for services in 1975.

This figure should not have been included in the calculations since it represented estimates of the entire DP industry, Nichols pointed out after questioning International Data Corp., a research firm, on this point.

Although the Legislature considered several motions to delete this provision from the governor's budget proposal, the lawmakers decided to include it, primarily for reasons of consistency, according to State. Rep. R. Michael Ferrall, assistant majority floor leader.

The sales tax law currently applies to "some but not all sales of computer and DP services," Ferrall wrote in a letter to Zeidler.

"This situation may lead to confusion as to what is and what is not taxed. This proposal would impose the sales tax more uniformly on DP services," he added.

Furthermore, "some aspects of computers services are similar to forms of data transmission which are presently subject to the sales tax such as telephone and intrastate telegraph services," he pointed out.

DP-Based Toxin Tester Gets Patent Office OK

WASHINGTON, D.C. — A computer-based instrument designed to instantly identify toxic substances in fluids and thus save the lives of victims of poison or drug overdoses was patented here recently.

The "video fluorometer" was invented by James B. Callis and Ernest R. Davidson, both of the University of Washington in Seattle.

The device, which is based on fluorescence spectroscopy — the study of light emitted by an excited sample as it luminesces — is said to be able to profile a complex substance in .017 of a second.

The system works by first amplifying the light from an excited sample with a low light-level television camera. The camera signal is processed by a computer and displayed on a video screen as a three-dimensional graph or topographical display.

The substance is identified by matching the pattern created by the chemicals in a sample with chemicals stored in the computer.

In addition to its obvious use in the medical field, the system could also be applied industrially where quick analysis of unseparated substances is needed, such as substances involved in oil spills, according to Callis.

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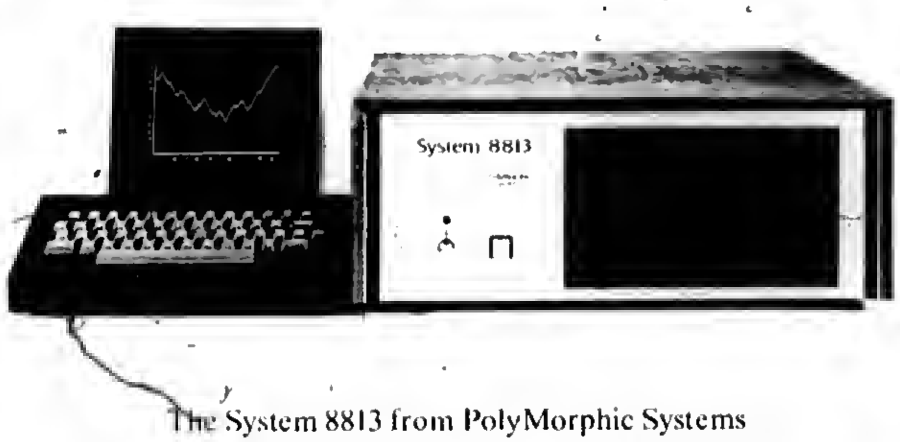

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School Reduces Consumption by 22%

DP Monitor Gets High Grades for Controlling Energy

By Ann Dooley
Of the CW Staff

FORT LAUDERDALE, Fla. — South Plantation High School here learned it could reduce its energy consumption by as much as 22% per month in an experiment with computer control.

Electricity bills had reached $5.2 million in the city schools last year and officials wanted something done about that.

So, the Broward County school board and the city of Fort Lauderdale set up a computer monitor in a few city buildings and one school to determine how much money would be saved under a computerized system.

Based on a Data General Corp. Nova 2, leased through Automated Data, Inc. of Miami, the control system delivers power only to areas of a building where it is needed.

Instead of turning the air conditioning on hours before the students arrive, the computer was programmed to activate the cooling system at the latest time possible without causing any discomfort to the students when they come in, according to Mario Gutierrez, the school board's mechanical director.

The system also shuts off the air conditioning for a few minutes every hour. The shut-off period is not long enough for the rooms to warm up noticeably, but it does save on electricity output significantly, Gutierrez said.

In addition, the computer is programmed to be aware of what rooms are empty during a lunch period or other hours during the day and to regulate the temperature accordingly.

Cooling Monitored

Previously, the air conditioning would run until the janitor finished cleaning all the rooms, Gutierrez said. "In essence, we were cooling off rooms at 3 p.m. that weren't going to be cleaned until 10 p.m. that night," he explained.

The present system allows each room to be cooled for set amounts of time, but only when the room is in actual use, he added.

"We had to work together very closely with the school to find out [its] schedule and coordinate everything," Gutierrez said.

"It took about 10 days to get the building in shape for the computer," he said. Equipment had to be adjusted and made compatible with the computer link.

Then, everything had to be analyzed to determine what kind of power load had to be controlled including the distribution of the power going to the air conditioning system, exhaust fans and equipment maintenance systems, he said.

Conservation 'Critical'

At South Plantation, the air conditioning was found to account for about 55% of an average $10,000 monthly electric bill.

The need for energy conservation is "critical", according to Jack Moss, county commissioner. Moss said he intends to ask the commission to fund an energy management survey of electricity use throughout the county buildings.

Exact figures on energy consumption at certain city buildings are not available, according to Moss. But based on the performance of Automated Data's system and others like it, "we could save at least 20% of our electricity bill by hooking major equipment into a computer," he said.

Savings Pay Expenses

The reduced electricity bills will pay for Automated Data's expenses within 20 months, according to James Buening, vice-president for that company.

Automated Data has worked mainly with hospitals and hotels in reducing energy consumption, and the Fort Lauderdale buildings are its first attempt at public buildings.

Although the company sells a stand-alone energy management system, Fort Lauderdale officials are leasing a Nova 2, located off-site. The system is linked via phone lines to a remote control panel unit at the school and city office buildings.

Panel Controls Usage

The control panel has 24 control points that regulate the energy usage. It receives and decodes signals sent from the Nova 2 and activates or deactivates energy at any certain area.

The panel can also generate signals back to the Nova to indicate the electrical status at any moment. The entire system can be overridden at any time and operated on a manual basis, Gutierrez added.

In Florida, air conditioning is a major source of consumption, but the computer also regulates the elevators, hot water tanks, intake fans and parking lot lights, he noted.

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Data Retrieval Calmer Without COM for Patent Office

By Esther Surden
Of the CW Staff

WASHINGTON, D.C. — Although the resident experts said "it couldn't be done," the U.S. Patent Office has solved a mind-boggling data retrieval problem that involves accessing a data base of "about 12 million patent documents in 95,000 subclasses." The solution was switching from computer output microfilm (COM) to a minicomputer.

"It is very important for the patent office, patent attorneys and the general public to know where a particular patent is classified," Jeffrey L. Forman, director of the Documentation Practice and Systems Division, said. "Making that information available has not always been easy."

However, the number of documents and subclasses in the patent office files is just the tip of the iceberg, Forman explained. The classification system is a dynamic one with approximately 600,000 documents . . . reclassified into new categories each year. Thus the classifications printed on the front page of each patent when it is issued cannot be relied on to reflect the actual status of that patent, he said.

Prior to installing the minicomputer, the patent office had maintained three separate files. Information on patents in a subclass could be obtained either from microfilm or in the form of a paper listing made from a weekly run of the files maintained by the patent office's Office of Computer Services, Forman explained. The classification of a particular patent number could be obtained through a "minicomputer-controlled microform display," he said.

In addition, two master sets of files were maintained — an examiner's search file that contained "unofficial cross-reference" patents (patent copies that, over the years, examiners have placed only in their own search files) and the public search room file.

Getting information on patents in a subclass from microfilm required determining which one of an 11-reel set contained the desired subclass and then searching that reel to find the subclass. The list of numbers for that subclass and notation as to whether the patent was an original or cross-reference were displayed in a dense, hard-to-read format that could only be run out on low-quality paper, Forman said.

The subclass listing run was on good, readable paper but it was not time sensitive enough, he added.

Retrievat System

The microform retrieval system, used in the public search room and to respond to in-house telephone inquiries, was a minicomputer coupled to a microform display. Users keyed in a patent number and the COM system retrieved microfiche, positioned to the correct dot on the strip. This fiche area, however, contained 100 patent numbers and classifications and was hard to read. It also suffered from mechanical breakdowns. Updating the system was time consuming so it was frequently out of date, according to Forman.

The experts at the Office of Computer Services told the documentation division that the files were too large to be accommodated on a minicomputer. However, the division continued its quest and came up with a viable system, Forman stated. "We relied on contractor personnel who are more expert to bring different systems to our attention," he noted.

The office chose a system based on a Four-Phase Systems, Inc. minicomputer with custom software developed by Commercial Software Systems Corp.

"One of the major factors in the equipment choice was the disk capacity that could be made available to us. We have to be able to take the master file and load it into the system in two different sequences," Forman noted.

The IV/70 processor acccommodates 120M characters of disk storage. Seven remote CRT terminals are tied to the mini.

"As an examiner or classifier tells the patent index person the patent for which he desires classification information, the patent index person keys that number into the terminal," he said. A readable display shows the patent number including the alphabetic subclasses in which it is classified in the examiner search file. This was the first phase of implementation.

Wider Information

Implementation of another phase of the system enabled the office to key a class and subclass into a terminal and get a screen display of all the patents in that subclass. The display also indicates whether the patents are originals or cross-references in that subclass.

The patents are displayed in pages of 15 patents, starting with the most recently issued, and the user can move to the next page or any desired page by keying in a number, he said.

The system also produces subclass lists, a function taken over from the large-scale patent office computer, he said.

All classifications are stored in an abbreviated address code form. "Therefore, each time you key in a patent number, the disk is being used not only to locate that patent number and its coded classifications, but also to retrieve the formatted class and subclass corresponding to each of the address codes," Forman explained.

"A terminal user interacts with the system under program control with messages and prompts displayed on the CRT," the software vendor said. "The system checks all keyboard input, diagnoses errors and allows rekeying if necessary. Because a separate copy of a program is loaded into the processor's memory for each user, different users can select the same or different capabilities. Only the required program elements are loaded."

The operating system features dynamic program relocation, enabling different sized programs to share memory, the company added.

Raytheon Funds Scholarship At Tufts to Honor Marshall

MEDFORD, Mass. — Raytheon Co. has established a scholarship at Tufts University here in honor of Dr. Laurence K. Marshall, a founder, president and chairman of the company.

Income from the grant will provide financial assistance to a student in the College of Engineering who has achieved academic excellence and who has demonstrated interest and accomplishments in other fields of study.

Raytheon was first conceived by Marshall and Charles G. Smith in a discussion on the Tufts campus 55 years ago. The third founder was Dr. Vannevar Bush, a roommate and 1911-classmate of Marshall at Tufts.

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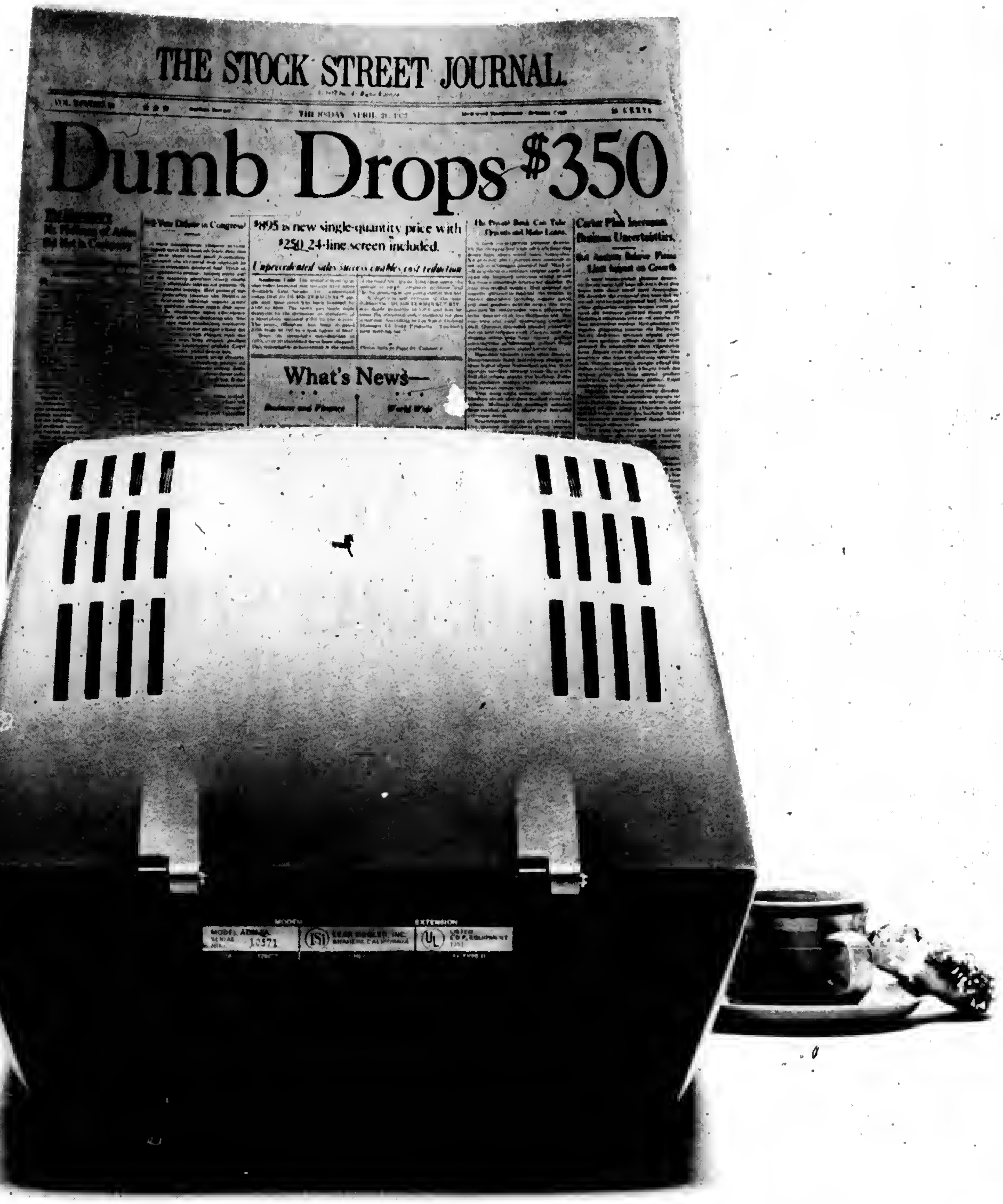
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What Basic 4, DEC, Microdata, Data General, etc. should know about distributors.

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The Waves of Change

By Charles P. Lecht

What does tomorrow hold for today's users? Lecht believes it holds design changes that will make system architecture more adapted to end users and problem solving. This week, in the latest excerpt from his soon-to-be-published book, Lecht discusses what those changes will be in the early 1980s and how IBM will incorporate them in its next generation, the System/80.

CHAPTER VIII

Future data processing hardware is expected to be more specialized and significantly more modular than it is today. "Generalized" local hardware components (common system building blocks) will be *dedicated* (i.e., distributed special-function units) for communications, computation, control functions, data-base management and for other specialized tasks.

These specific task-oriented modules or process engines will be dynamically combined according to application processing requirements, interconnected and linked via software and firmware to form the system.

Moreover, remote distributed functions and processing networks (as contrasted with local distribution) will permit various users to control their own local equipment, but a central DP staff must still have responsibility for development, maintenance and coordination of the corporate DP strategy, corporate data base and general (interdepartmental) applications software and standards.

Processing will move out closer to the end user; if one processor or engine fails, the entire organization will not be brought to a standstill.

Systems will be simple and easier to use in this more remotely distributed environment. The user will be able to focus more on the desired logic and solutions than on the processing techniques needed to achieve them.

The major systems suppliers will create a data base/data communication environment in which users have greater control of their data and develop their own special uses for the data; however, in the full function of data base management, data must be carefully characterized either as a corporate resource or only locally meaningful.

As a Future Requirements Study recently presented by the Guide (IBM 370 users group) Future Division put it, "Management is crying out for DP systems which are more usable. Managers like to manage, and they feel uncomfortable with present-day DP systems which are so complex that they defy understanding . . . defy management . . . we can look for users to be more knowledgeable, more demanding and much more involved in specifying the systems from which they derive benefit." New applications should soar when the end users become more involved.

"User-oriented" systems will require changes in the traditional design of computers. The data management function, or "system resource repository and controller," will become the focal point of the system or network of systems, and the processors (CPUs) will play a more "peripheral" role.

"Problem solving" systems will evolve in such a way that hardware and software details or idiosyncrasies become unimportant to end users.

With high-speed, broad bandwidth data communications available, the system itself will determine how and where processing is done and storage maintained. Operators will make fewer decisions as "secure" operating systems take complete control of the system resources.

Ease of use is perhaps the No. 1 objective. Innovative and complex software, firmware and hardware structures will be required to attain and support this objective. Hardware and software will be strongly interrelated as users become more and more dependent on the systems to assist or guide them in the solution of even the most mundane problems.

Two Network Approaches

Under the network concept, "intelligence" will be available in peripherals and terminals, as well as controllers and processors. (Terminals provide multiaccess capability to a computer network. Even a sensor may be considered a terminal since direct access to a computer is provided.)

Figure VIII-1 depicts the current, "traditional" machine organization. All parts of the system are clearly identifiable by the user. In the network systems of the next decade shown in Figure VIII-2, the user has access to a limited number of terminal devices. The balance of the hardware and the communications capability becomes essentially transparent to the users. Communications linkages of varying capacities connect the various nodes of the network.

Another approach to a network is shown in Figure VIII-3. Here, regional centers control several local centers. Data banks for general-purpose use are concentrated only at the regional centers, with broadband communications links between these centers.

The local centers are connected to the regional station via remote job entry stations and terminals. Local centers thus become satellites to the larger regional operation.

Such an organization of systems/capabilities permits a decentralized system to have some of the advantages of centralized, concentrated data bases. It should be emphasized that although remote subsets of data bases or special, unique files are available at the terminals, our judgment is that it will be impractical and inefficient to decentralize the *total* corporate integrated data base by as early as 1980.

The distribution of total corporate data bases will not generally be realistic because communication costs are still too high; large disk files will remain relatively expensive; and concurrent file updating and maintenance is too complex in a distributed data base environment.

In addition, data base security and privacy can be more easily implemented and controlled if the sensitive corporate data base is distributed over fewer locations.

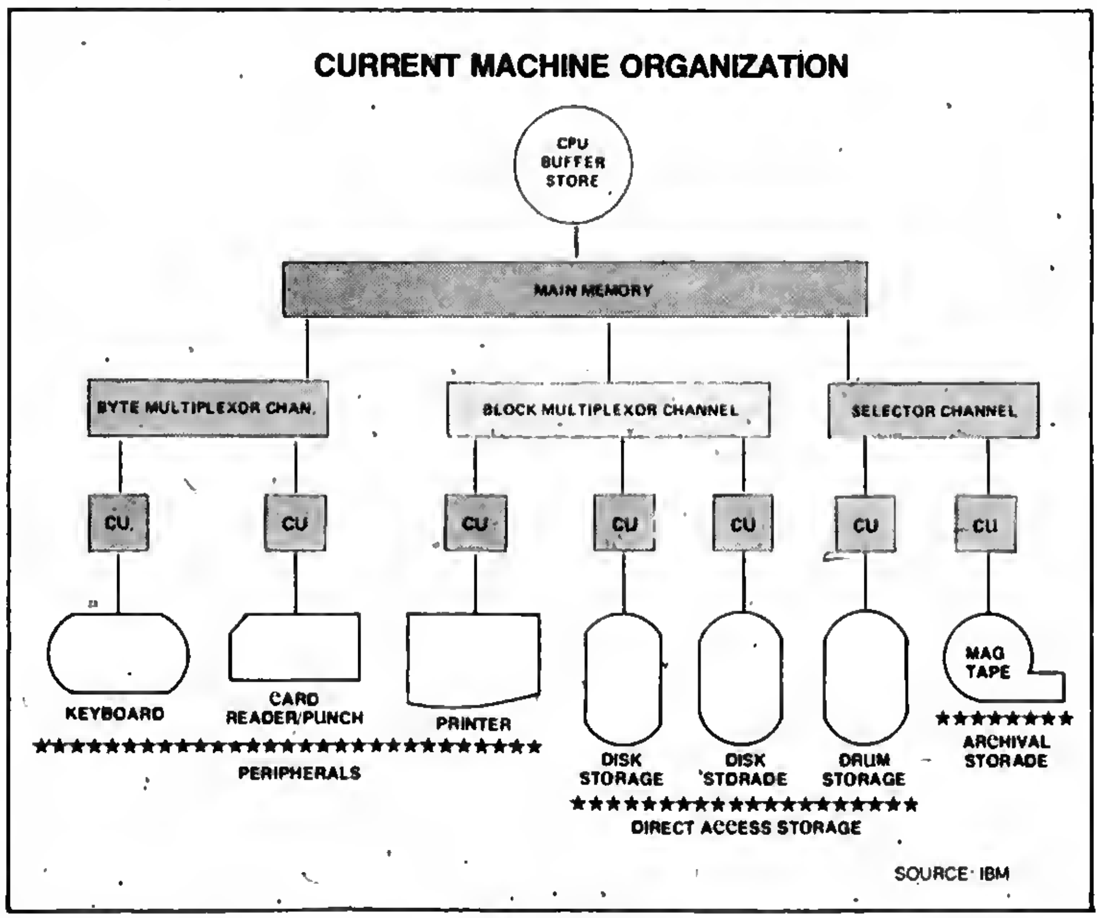
Future System Architecture

More on-line, communications-oriented, transaction-oriented and real-time systems will evolve as these systems become easier to use, as privacy and security concepts are proven and as systems become more reliable and dependable.

Systems of the 1979-84 period will exhibit such characteristics, although their growth will continue to be restricted by AT&T communications tariffs and line inefficiencies (until AT&T can fully implement digital networks, or until IBM communications satellites and private branch exchanges [or PBXs] become operational).

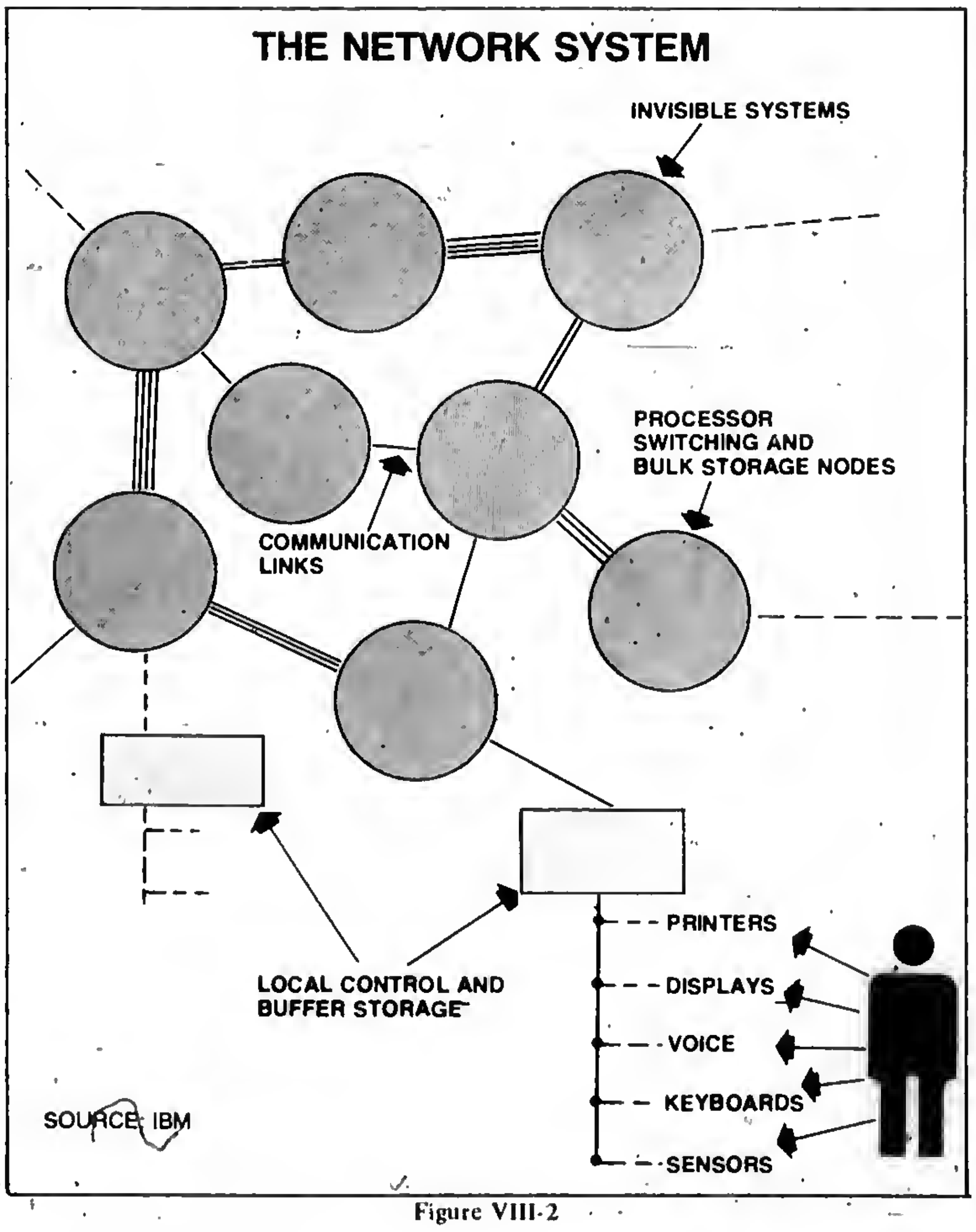
In short, system architecture in the early 1980s will be more adapted to end users and problem solving. One can anticipate that IBM's System/80, along with systems developed by other major innovation-minded vendors, will exhibit the following charac-

(Continued on Page 12)



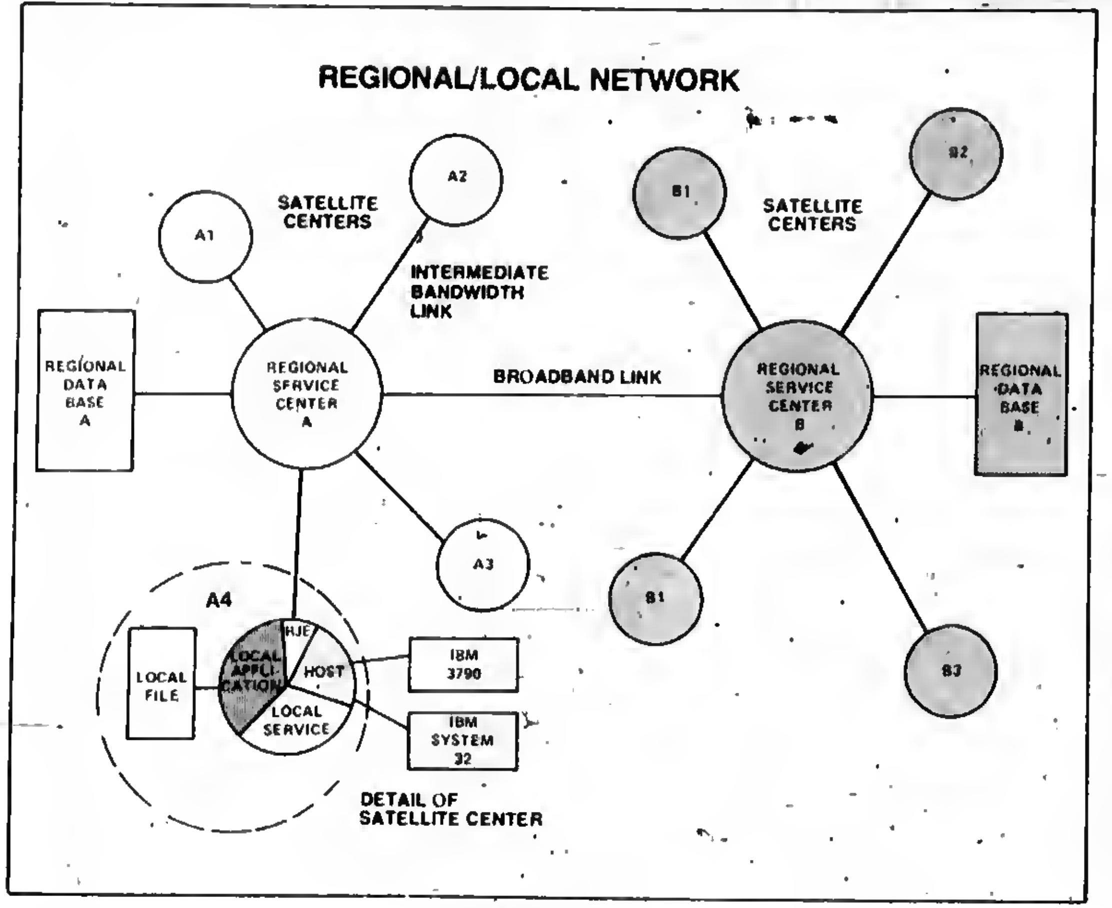
SOURCE: IBM

Figure VIII-1



SOURCE: IBM

Figure VIII-2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A3
A4
LOCAL FILE
LOCAL APPLICATION
RJE
HOST
LOCAL SERVICE
IBM 3790
IBM SYSTEM 32
DETAIL OF SATELLITE CENTER
B1
B2
SATELLITE CENTERS
REGIONAL SERVICE CENTER B
REGIONAL DATA BASE B
B1
B3

Figure VIII-3

> *The System/80 'represents a radical architectural departure from previous general-purpose 360 or 370 designs. However, from the standpoint of the user software interface, the architecture would appear to be upward-compatible.'*

(Continued from Page 11)

teristics in support of end-user objectives in the coming decade:

1. *Distributed special-function processors:* Instruction stream processors (IP), file processors (FP), media processors (MP), communication processors (CP), sensor or event processors (SP) and a supervisor processor will be provided. Special array or vector processors and essential emulators will also be available.

2. *Interpretive processing capability:* For the program development environment, high-level microprogrammed IPs which execute source code (such as PL/I, Cobol, Fortran and APL) directly will be provided. "Standard" native mode IPs will also be available for the more performance-conscious, production-oriented users. (We already see examples of this interpretive processor or "engine" with the IBM 5100 and APL assist feature for the Model 148.)

3. Multiprocessing: Multiple main IPs will be supported and each process engine will be adapted by read-only memories (ROM), programmable ROMs (Prom) or writable control stores to execute a particular high-level language subset or superset. The non-interpretive, native mode IPs will execute in-line code at internal speeds which are approximately four times current performance levels.

Merged transistor logic (MTL), also known as MPT, with propagation delays approaching 5 sec or 50 nsec at the 1K device level, will likely be used to achieve these speeds.

4. *Memory hierarchy:* most process engines should utilize their own private high-speed cache (buffers) as well as up to 256K characters of integrated main memory, and all engines will be able to share a larger (over 100 million characters) secondary or bulk MOS storage.

(In this context, it should be noted that "bytes" has been dropped from most IBM 370 documents, and the System/80 "character" may be defined on a dynamic basis, i.e., consisting of 4, 8, 9 . . . n bits depending on the function to be performed.)

Backing up the shared MOS memory will be bubble storage. All four levels of storage (i.e., Cache, MOS, bulk MOS and bubbles) will transfer data blocks or pages automatically, probably based on a "hard-wired," frequency-of-usage replacement algorithm.

5. *High-speed, wide band bus:* All the local system resources and process engines will exchange data and communicate with each other via a unique wide band, multiaccess bus. The characteristics of the main bus are uncertain at this time, but IBM and other vendors are known to be working on "fiber optic" I/O techniques which use a solid-state laser source.

6. *Input/output interconnection:* A single multiplexed wire (coaxial cable) or loop (dual loops will be optional for redundancy) operating at very high speed will replace today's numerous cables. This loop system will also permit moving more intelligence in-board, in effect replacing the "channel" function with special integrated I/O processors.

Functional Overview

A conceptual diagram illustrating the probable structure of System/80 with all the distributed special function elements is shown in Figure VIII-4. (Note that names given to a particular "box" are my own labels. Obviously, IBM's specific model numbers will not be known until announcement time.)

This represents a radical architectural departure from previous general-purpose 360 or 370 designs. However, from the standpoint of the user software interface, the architecture would appear to be upward-compatible.

The "process engines", e.g., APL, Fortran, Cobol and PL/I, are microprogrammed and interpretive; i.e., they can execute source code (except for the native mode, 370 and Fast Fourier processors which may represent more tailored or optimized engines).

In our conceptual view, System/80 would function approximately as follows: jobs are submitted locally or remotely via card readers, diskettes, consoles or terminals to the *media processor* or through the *communication processor* (and passed on to the media processor) for preprocessing.

During this preprocessing, workload queues are created; required system resources are schedueld; data files are requested; and data relationships are established within the outboard data manager (ODM), or "system resources repository," and the particular interpretive processors (for development work) or native mode processors (for production work) are allocated as required.

When all the necessary system resources

(Continued on Page 13)

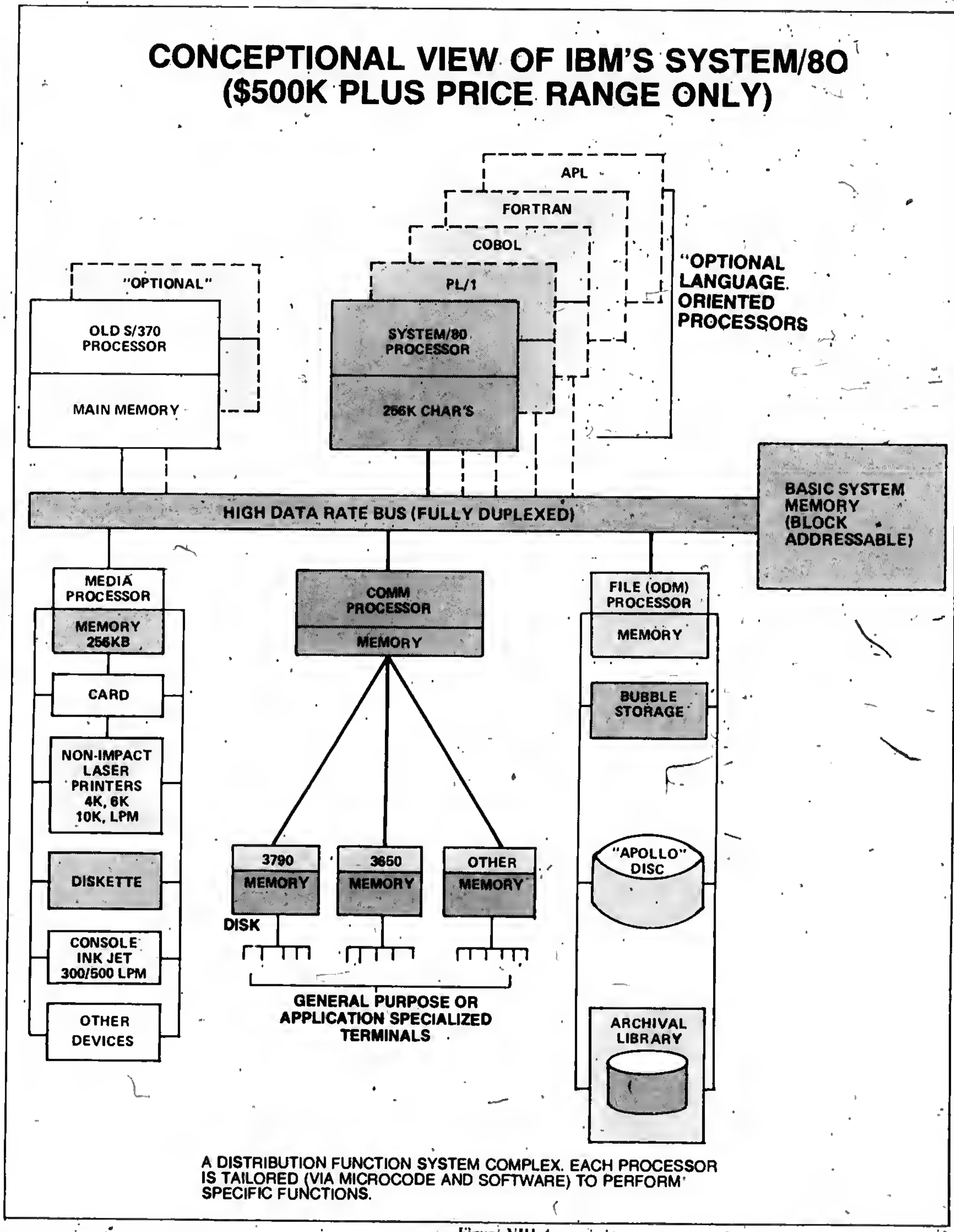
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Figure VIII-4

> *'The System/80 operating software will pull the various hardware, microcode and software elements together into an efficient "information-processing system." . . . The major requirement is that it be usable by both professional programmers and the general public.'*

(Continued from Page 12)

are queued or scheduled, the job streams or tasks are sent to the *basic system memory* (BSM), i.e., the common, sharable memory, to await execution. As the required special-purpose or native process engines become available, tasks are blockloaded from BSM to the faster, private process memory (this memory will probably be 10 times faster than the BSM).

All required library routines, files and data relationships at this time have already been established and prestaged onto more efficient BSM or (if necessary) to bubble storage *prior* to the actual task execution step. At this point the main process engines (Cobol, PL/I, etc.) will execute the tasks to completion.

Should higher priority activities or real-time events interrupt task execution before termination, then the entire task and its status is temporarily swapped back to BSM for later processing and eventual termination.

If the current system workload mix is primarily application development-oriented, e.g., Cobol, then some or all of the process engines could be loaded by the supervisor processor with "Cobol micrologic," which is optimized for program development, testing and/or debug analysis. (In other words, the system *dynamically* adapts its resources to the current workload.)

In many situations, tasks will not require any allocation of native or interpretive processors at all; examples include file maintenance, extraction, reporting or inquiry. In this case the ODM, media processor or communication processor (three functions which, in fact, may be combined in a single box) will be able to handle such tasks without interrupting the main process engines.

We can find some examples of this off-line special-function engine capability today in the IBM 3850 mass storage system control design.

This dynamic adaptation and linkage of resources (logic, control storage and microcode, main memory and I/O devices) to suit the particular process load is substantially different from current-generation, general-purpose time-sharing or multiprogramming concepts. The special-function, locally distributed engines provide dedicated resources for each type of task (this does *not* preclude reentrant or concurrent use of specific resources) and do *not* attempt to interleave this task with other different tasks.

For example, a Cobol and Fortran compile process would not coexist or have to be multiprogrammed within a single engine.

Another major type of "process engine" may be what I would call the "macro processor" that is optimized for execution of production-oriented, native machine code. After source programs have been fully checked out using the interpretive processor(s), software (compilers) would be optionally available to convert user programs to native object code.

Naturally, many jobs, especially in a university or research environment, are one-shot types which may never need to be converted to more efficient object code. Array processors or Fast Fourier analysis "engines" represent another form of specialized, microcoded processors which execute object code.

Potential Advantages

Some of the potential advantages of the above-described System/80 conceptual design include:

- The distribution of supervisory functions — the special processors may simplify operating system control requirements and reduce overhead.
- Better system balance and resource utilization because of the system's automatic "adaptive" characteristics.
- Increased overall performance because of hardware or firmware (microcode) implementation of many frequently used software functions.
- Improved system security and integrity capability arising from functional isolation.
- Simpler and easier data access, since the system resource repository or ODM handles most data requests and relationships.
- Highly modular design for future expansion and growth; e.g., additional IPs, CPs, ODMs and SPs can be added as the workload increases in smaller steps.
- More cost-effective redundancy ("fail-soft") capability.
- Easier conversion via interpretive processors and emulators.

How will the IBM System/80 be packaged? One possible structure is illustrated in Figure VIII-5, where everything is integrated in one total package. The advantages of this packaging include lower reproduction cost; more difficult plug-compatible replacement of individual components; and lower space requirements.

System Software

The System/80 operating system will pull the various hardware, microcode and software elements together into an efficient "information-processing system." The software for System/80 is the key to the reorientation in systems thinking. The major

(Continued on Page 14)

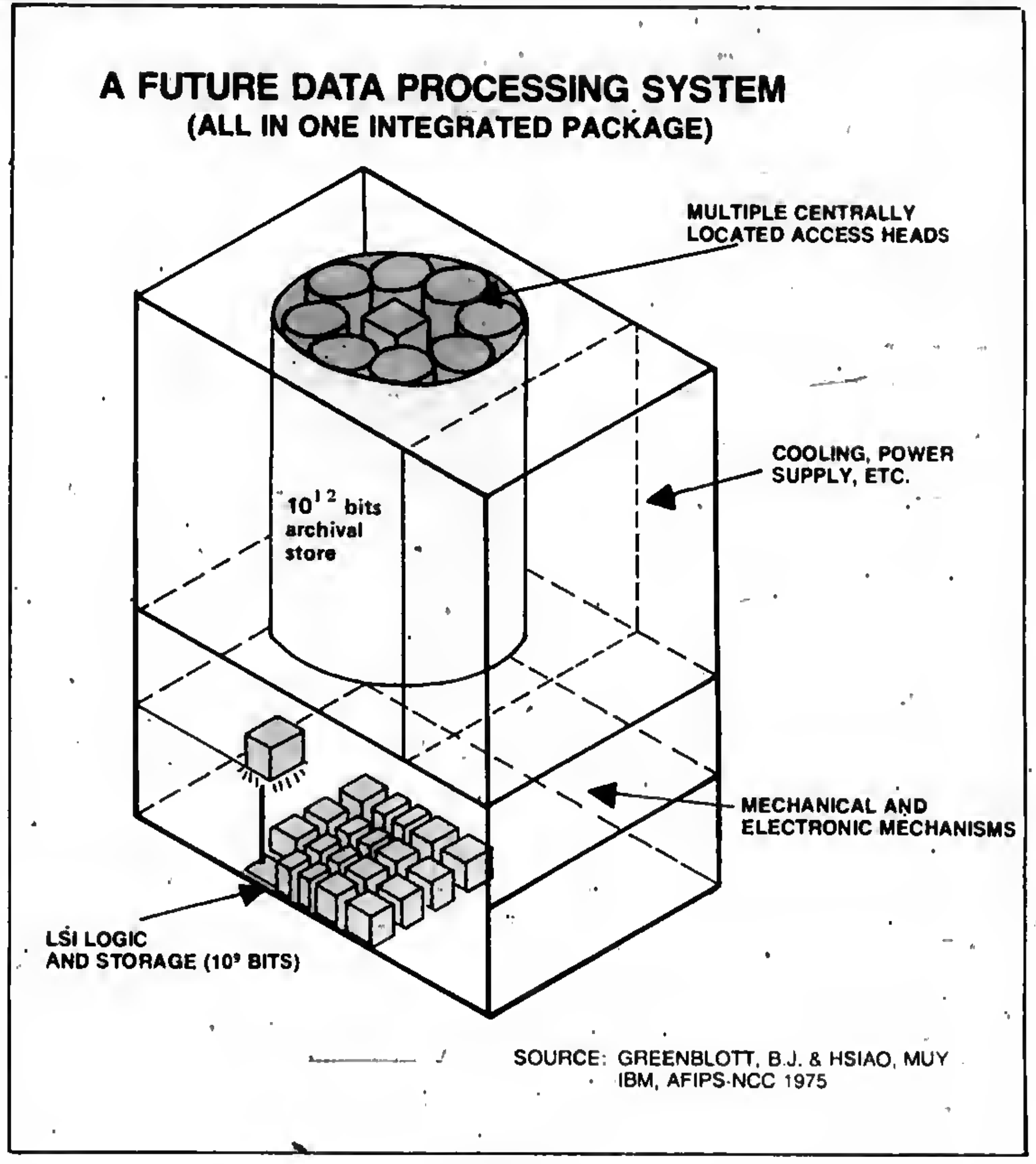
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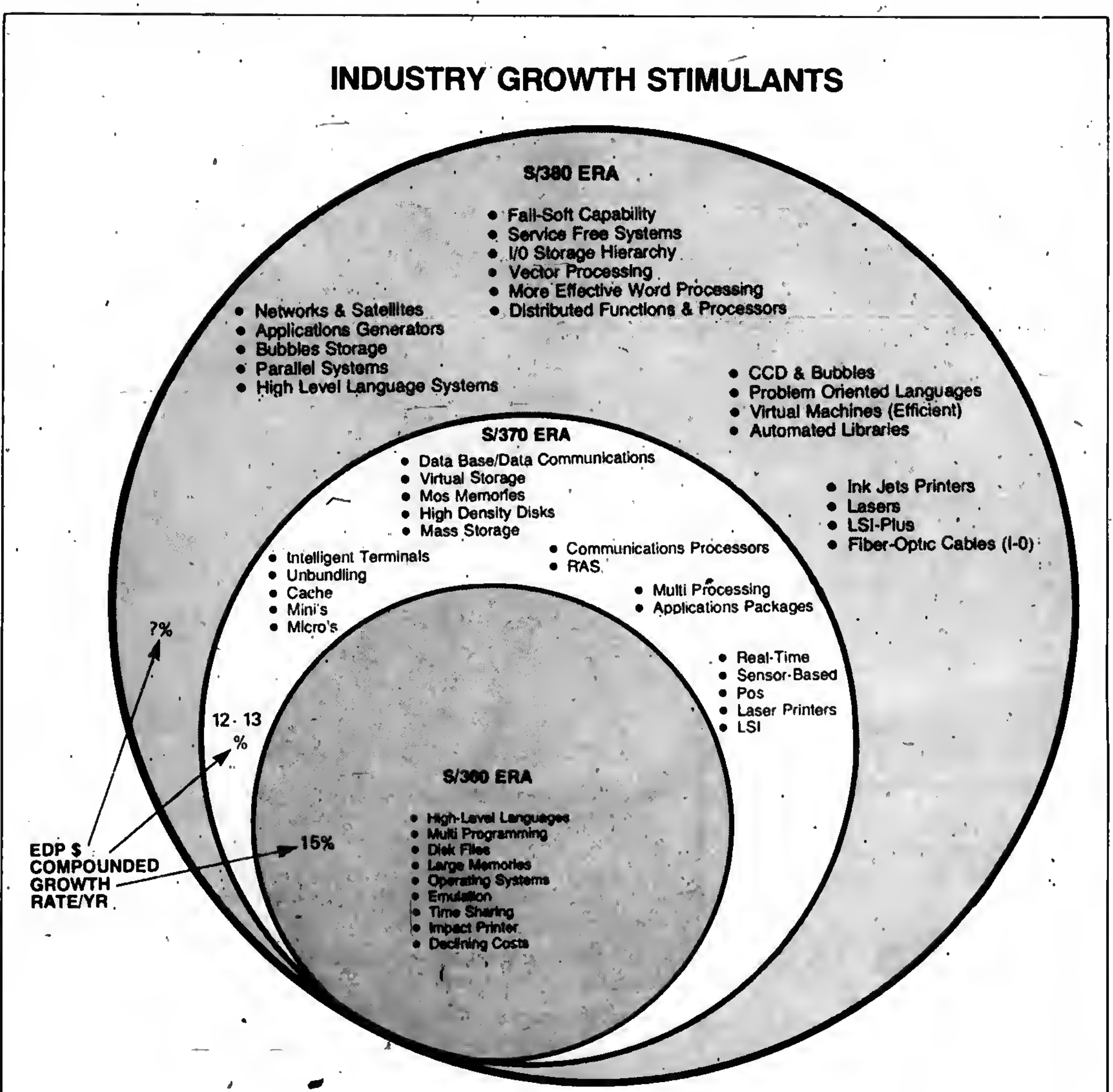
Figure VIII-5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• Impact Printer
• Declining Costs
?%
12-13 %
15%
EDP $ COMPOUNDED GROWTH RATE/YR

SOURCE: A.C.T.

Figure VIII-6

The Waves of Change

(Continued from Page 13)

requirement is that it be usable by both professional programmers and the general public.

According to the IBM trial documents (in the Telex case), "The system must be usable by people who are not programmers, not professionals, not college graduates and not necessarily high school graduates." For the professional, extensions in languages, data handling and system facilities would need to be made.

To meet the requirements of nonprogrammers, on the other hand, an IBM study group recommended the following:

1. "A layman's language to facilitate system use."
2. "A general-purpose query update language (a subset of the layman's language)."
3. "A Common Command Language by which, with equal facility, operators may effectively manage both simple and complex installations."
4. "Language facilities that emphasize simplicity for the user, provide inherent tutorial capabilities (e.g., leading by hand, etc.)."
5. "Facilities to implement occupational or problem-oriented languages . . . based on industry terminology."

Programmer Features

The professional programmer would have new features with which to work, including:

1. "Extensions to current languages to facilitate the implementation of data independence, the identification of parallelism within programs, the variable binding of programs to system resources and [the provision of] data flexibility to meet [future user] requirements."
2. "Expansion of compilers to provide interactive execution for computer-assisted problem solving, program development and debugging."
3. "The introduction of all new functions via the primary higher-level languages of the marketplace."
4. "Minimization of the requirement to use lower level languages for new functions."

What does all this really mean? The basic thesis is ease of use and support for the concept comes from the necessary program strucures. The end result is that the program restrictions of the past will be reduced or eliminated.

Some additional system software goals are outlined below:

- User orientation

Nonprogrammers, executives, nonprofessionals
Bridge gap between man and machine
Unify all system software
Reduce maintenance and support required

- Availability

Isolate users from each other
Correct minor system anomalies

- Opacity

Divorced from hardware concerns

- Greater user security and privacy
- High-level languages only
- Migration and coexistence of new and old

Eliminate forced conversion

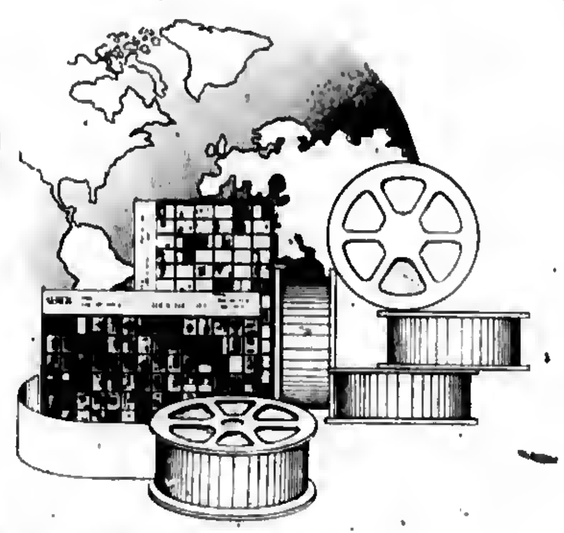
- Higher level of reliability, availability and seviceability (RAS) "like a utility"

Failure detection, isolation and bypass
Automatic restart and journaling
Automatic reconfiguration

- Multiprocessing support
- Computer networks support

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, the Programmer's Algol, The Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.



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Editorial

A Mini Plea for Help

Are minis really taking over the DP world? The survey below is designed to help us find out.

We'd like to know how widespread the use of minis really is and how people are buying and using them.

Take a few minutes to help us answer these questions. The results of the survey will be published in a future issue of *Computerworld*.

Just fill out the form and return it to us in the prepaid envelope provided in this issue. Mark "Editorial" on the outside.

1) What class of small system do you have?
(a) small business system (b) minicomputer (c) supermini (d) distributed processing system (e)other ______________________

____

2) How many small systems do you have?

____

3) Please identify the systems by manufacturer(s) and model(s ______________________

____

4) Do you have a large mainframe? Which one?

____

5) Do you use your mini(s) for single or multiple applications? ______________________

____

6) Would you rather (a) do your own programming (b) get outside programming help or (c) purchase a turnkey system? ______________________

____

7) What was the major criterion that made you decide on this particular system (or systems)?
(a) Word of mouth (b) ease of programming (c)throughput (d) price/performance(e) software capability (f) vendor reputation (g) other ________

____

8) How would you rate your vendor's hardware maintenance? (a) excellent (b) good (c) poor Why? ______________________

____

9)How would you rate the software support you have received from your vendor? (a) excellent (b) good (c) poor Why? ______________________

____

10) What will you do when you "outgrow" your present small system? (a) grow Into a mainframe (b) get a larger mini (c) offload the system with another small system (d) other ______________

____

11) Is the final purchasing decision about minicomputers made by (a) ~~an~~ end user department (b) central purchasing department (c) central DP department (d) other ______________

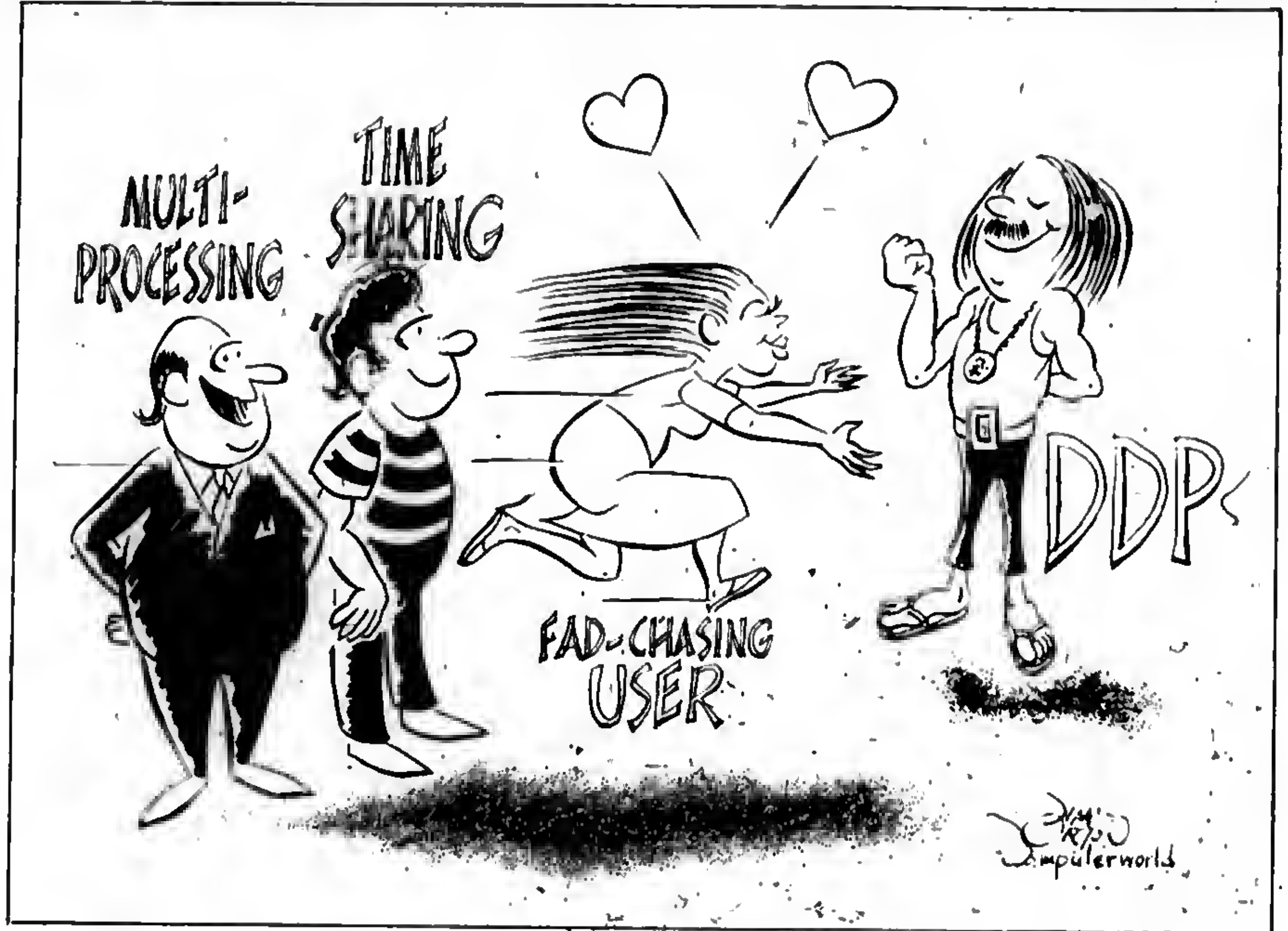
____

Comments ______________________

____

____

Optional
Name ______________________
Company ______________________
Position ______________________



'He Has Some Crazy Idea It's Gonna Last . . .'

Letters to the Editor

Some Exciting Micro Developments Deprived of Adequate Coverage

I just finished reading the June 20 issue of *Computerworld* that included a number of reports on the National Computer Conference. I am very surprised that it appears that you have ignored some of the very exciting microprocessor developments.

I am thinking especially of the PET microcomputer system introduced by Commadore, which delivers a complete 1K Basic system for $800.

The computer industry seems abuzz with this development and many of us in the computer industry are very excited and hopeful that this is an exciting portent of things to come. To find no mention of it in your June 20 issue seems a little unusual.

I guess this wouldn't seem quite so strange if other people had not called to my attention in the past that CW seems to somewhat ignore the micro field. This came up last when the Microcomputer Fair was held in San Francisco and there was no apparent mention of it in your publication.

I should let you know that one reader is wondering why you are ignoring such an exciting new field. I hope you will give more news to the microcomputer developments; otherwise some of us may not renew our CW subscription and will renew our subscriptions to *Byte, Personal Computing*, etc.

Gary Carlson

Provo, Utah

On Protecting the CDP

I have held my Certificate in Data Processing (CDP) since 1965, but have not been particularly active in any of the many organizations for DPers and industrial engineers. It grieves me, however, to see the members of a profession, who should be proud of its achievements and its future, scuffle over trifles.

This is not the mark of professionalism.

Kenniston W. Lord Jr.'s item in the issue of June 20 ["Your CDP Designation May Become Outdated Unless You Speak Up"] caused me to offer my thoughts on the subject of multiple examinations in every conceivable facet of DP.

The thoughts were originally expressed in a letter to the Society of Certified Data Processors in response to a questionnaire on attitudes towrds this and other related subjects. It is not often that I agree with Ken's ideas, but in this instance I am with him 100%.

If you want a device for tradesmen to boast, "I am a certified ______" (fill in the blank with programmer, coder, data base specialist, keypuncher, computer operator, systems analyst, computer auditor, etc. ad nauseam), then by all means provide a batery of tests.

But, if you want recognition for true data processing professionals, follow the lead of the accountants and provide a single examination reinforced by educational and experience requirements which will identify the professional and distinguish him from the journeymen.

Do not cheapen what so many have worked so hard to obtain.

John J. Mason

Hillcrest Heights, Md.

In Defense of Best Interests

Contrary to a reference in the article entitled "DOD May Soften Stance for Standard on Channel-Level I/O" [CW, May 30], IBM has never said its I/O channel interface was technologically obsolete.

We are opposed to its adoption as a Federal Information Processing Standard because we believe creating this type of standard can deny the federal user of future technological advances, which is clearly not in the best interest of the user, the government or the computer industry.

J.S. DeBlasi
Director of Standards

IBM
Armonk, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
July 5, 1972

HARRISBURG, Pa. — The big cleanup began after tropical storm Agnes crippled DP centers in five states. DP managers in hard-hit areas made plans to install new systems and tried to retrieve lost files by any means available, including drying out millions of waterlogged punch cards and cleaning out mud-coated disk packs and tapes.

— — —

SACRAMENTO, Calif. — A bill which exempted from taxation all software except that sold with a computer was signed into law by Gov. Ronald Reagan. The exemption was for two years and was intended to give the state time to arrive at a sound basis for assessing all software.

Eight Years Ago
July 9, 1969

Increases of up to 25% in DP costs were expected by major users of IBM equipment as the primary result of IBM's unbundling, effective Jan. 1, 1970.

— — —

NEW YORK — Intercomm, a system monitor called the "missing link" of communications was developed by Programming Methods, Inc. for the IBM 360. The system was intended to provide a comprehensive package that blended the accessing of data, the operating system and the data base into a single environment.

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Business Employers Discriminating?

Should a Degree Be a DP Employment Requirement?

By Jack Stone
Special to Computerworld

Legislation passed during recent years protects Americans against discrimination in employment on the basis of race, creed, color, national origin, sex, age and physical appearance, among other qualities.

These laws have given rise to agonizing reappraisals of current policies, methods and tools for DP personnel recruitment, placement, promotion and discharge.

For example, aptitude testing for entry-level DPers is currently under fire because of concerns that such tests are inherently biased towards certain social classes and therefore, are not sufficiently accurate in predicting successful performance in the DP environment.

Another issue, the subject of this week's column, is the question of whether the specification of a college degree is a proper prerequisite for employment of a programmer or analyst who is exclusively engaged in the support of business systems.

The implication is, of course, that the college degree establishes a basic level of competence in the field, irrespective of the knowledge a myriad of DP career successes achieved without degrees.

As illustrated in this passage excerpted from a recent recruitment advertisement, the connection between the job need and a B.A. degree often appears tenuous:

"Junior analyst/programmer with experience in the development of interactive systems using Cobol and TSO on IBM System 370. Knowledge of commercial data base management systems in support of health or medical research programs preferred. Bachelor's degree and minimum two years experience required."

The issue is well presented in this eloquent letter from a regular reader of this column:

Dear Jack:

I have read the recent items in *Computerworld* concerning discrimination against women and the relative merits of recent computer science graduates as opposed to experienced programmers.

I also read the letter in the March 7 issue of CW from Lynn Pond of Chicago, who is not having much success in finding a new job because she does not have a college degree, even though she has 20 years experience.

I have tied these two observations together to arrive at the thought that perhaps there is a bias against otherwise qualified persons in DP who do not have college degrees.

My situation is as follows: I have several years of experience as a business applications programmer and am presently using Cobol on an IBM 370/135 running under DOS/VS.

My programming knowledge came from several different sources. I attended the Control Data Institute shortly after I graduated from high school, and I received on-the-job training where I worked. In addition, I took evening courses in the computer science department of the local community college, where I have accumulated 35 credit hours.

One reason I have been taking college courses is that I am afraid one day I will be unable to find employment for which my programming experience has prepared me because I will not have a college degree. Several concerns have led me to this belief:

One is the talk of the "Certified Data Processor" requirement. As I understand it, if the state legislatures were to pass this requirement, one would need to hold a Certificate in Data Processing (CDP) in order to perform certain functions. In order to qualify for the CDP, one would need a four-year college degree.

Also, despite the fact that I am not looking for a new job, I periodically check recruitment ads just to stay abreast of things. There are frequent ads for business applications programmers using Cobol which state that a degree is required. Because the ads describe work that appears to be the same type as mine, I have difficulty rationalizing the need for a degree.

The Human Connection

I have come up with some possible explanations of why organizations require degreed people for business appliations development, but I don't see their validity:

- Perhaps these organizations fear (or hope) the CDP requirement will go into effect and are preparing for that day by hiring only persons who will have the academic credentials to sit for the exam.
- Maybe the organization wants to be sure it is hiring people who have mastered basic writing and math skills commonly taught in college. But since these skills are taught at the freshman level, why not at least consider persons who have some college experience but no diploma?

And, as a matter of fact, why not consider those individuals who have learned these skills in high school or on their own?

- Perhaps these employers shy away from people who have some college credits but haven't graduated because they want someone who has shown perseverence during a four-year period. Wouldn't continued employment with the same firm or in the same field be just as acceptable?
- Maybe these employers are afraid to hire someone who has left college without a degree, feeling that this person "flunked out." Yet, many people who have left college for academic reasons have proved successful in their DP working careers. College classes which lead to nonsuccess often have no relationship to DP training.

And many people have left college without "flunking out" — it is widely accepted that college is just not right for everyone. Also, just because a person doesn't go to college does not mean that the person wouldn't do well if he attended college.

Although a college education may not always be required for an advertised position, most companies require a degree for advancement.

Therefore, I would suspect that in such circumstances only degreed people are considered in order to avoid hiring people with a limited opportunity for advancement.

Perhaps the question of the need for degreed people in DP management positions is one to be explored on another occasion).

As a closing note, my current employer has no employment requirements regarding college education, and I think we do very well.

Regina S. Litman
Rockville, Md.

Readers wishing to express their views on the subject of college requirements for business DP may write to Stone, Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

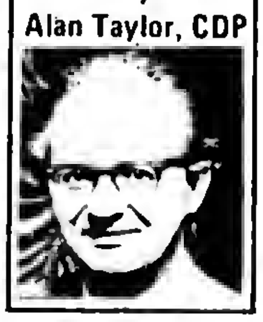
Ombudsman Concept

Individual Attention Can Improve Accuracy of Letters

Last month's *Communications of the ACM* had one of the more disturbing announcements in it regarding the Association for Computing Machinery's (ACM) use of personalized letters — in this case from its Ombudsman Program. It read:

"**ACM Ombudsman Program.** The chairman of the ACM Ombudsman Committee, Dahl Gerberick, is asking all ACM members to take note of articles that appear to blame the computer for some problem. Please clip and send such items to James Adams at ACM headquarters. A personalized letter from the ombudsman will then be sent to the publisher of the article or story, pointing out that the computer is only a tool and should not be blamed for its use."

The Taylor Report
By
Alan Taylor, CDP



The whole basis of the "ombudsman concept" is that individual consideration is given to each specific occurrence. Now, it appears the program is going to give individual consideration to each letter by personalizing it to the publisher. But that type of personalization does not give individual consideration to the computer-related problem behind the complaint.

Knee-Jerk Reaction

When the program apparently intends to do is give an automatic reaction to the articles' failure to explain the well-known difference between a program and a computer. In actual fact, "computer" is now common shorthand for computer-programmed logic or output.

For instance, the General Motors ad on the back cover of the *Communications* talks about computers that "see" and about a computer system that "learns" and "inspects."

Apparently no one at the ACM objects to this phraseology or to the computer being given the credit perhaps due some software people. Why should we then continue to object to normal shorthand use of "computer"?

Positive Side

Yet, personalized letters may not be such a bad idea after all — if the ombudsman understands he is not just a public relations man, automatically defending computers, but is a thinking, responsible person.

Personalized letters, no matter how bad in the first place, can act as a two-way communication method for improving the sender's understanding of the situation.

The Ombudsman Program, through creative use of such letters, could improve the ACM's understanding of what the world at large is actually thinking.

This use of personalized letters as a two-way operation is perhaps best known through the *Newsweek* life-time guarantee program, which has been running for about 30 months now. Its latest version arrived in the same batch of mail as the ombudsman's appeal.

One of the selling tools of the *Newsweek* campaign from its outset was the idea that everyone had been "selected." In early efforts, this was brought out in a paragraph that used the street address, but this sometimes led to results such as:

"You can be certain, **Mr. Clinic** . . . That this letter is not popping up in everyone's mail **on & Colby**."

This comes from the address: S.A. Clinic, 39th & Colby, Everett, Wa. The street address has since been omitted in the letter in favor of a more general: "The letter you have just finished was sent to a carefully selected audience."

Another Focus

Another focus of the appeal was parental responsibility, using "household" or "family" with the presumed last name. The results went wrong in some cases such as this:

"You didn't know? With **Newsweek**, the **Dir DP household** would. Just read a little further for a few choice words from **Newsweek** about . . ."

The word "household" has since been changed to "children," which solves some problems, but not all; a clinic, for example, could have children.

After receiving *Newsweek*'s latest mailing, I had a few words with the fellow behind the program, Daniel Capell, a *Newsweek* vice-president.

Improvements in the mailings came about through reading recipients' complaints and then, after agreeing they were or were not justified, initiating steps to come up with another way of saying the same thing more accurately the next time around.

This apparently doesn't give Capell any great trouble. He just spends a few moments analyzing the complaint and deciding what to do about it. Most complaints reach his personal desk, so real consideration at a policy level is reached quickly.

Working Solution

This correction system works.

When the *Newsweek* campaign started, and for over a year afterwards, many of you sent copies of its letters, but I haven't had more than a couple in the past six months, although there still are name problems. One unexpected problem is in not carrying the title "Mrs." through with a repeated married name. This failure creates unnecessary confusion with the husband in many cases, and sometimes with the children, if only initials are used.

Hopefully, if the ACM letter is phrased so as to invite communication from the people who wrote the articles about computer faults — and if the ombudsman takes the time to review both the articles and the responses properly — we can hope for a really useful understanding of the advancing knowledge of computers.

Both the bad and the good parts will become understood both inside and outside the ACM.

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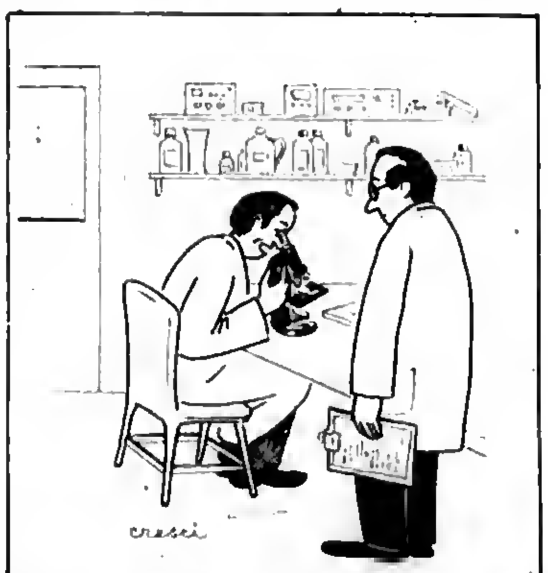

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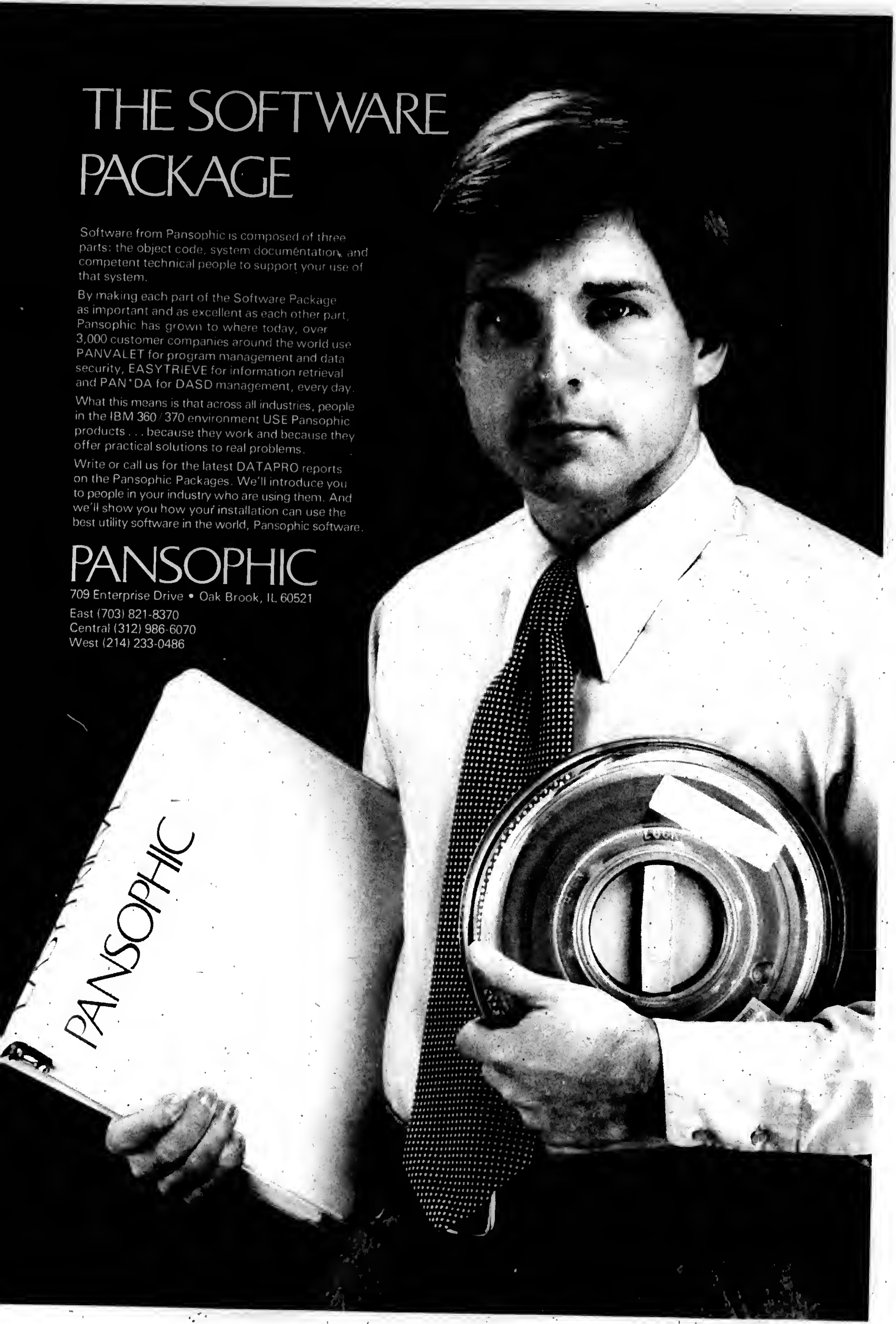

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Five Basic Steps Described

Multilevel Approach Eases Data Base Design Chores

By Don Leavitt
Of the CW Staff

DALLAS — The design of large data bases involves a wide range of problems — from the application system specification to the choice of hardware. That is a difficult assignment, but a multilevel approach to the design of file organization seems to help, according to Arne Solvberg, professor at the University of Trondheim, now on leave and working at IBM in San Jose.

Such an approach has several advantages, Solvberg told attendees of a session on data base structure and organization at the National Computer Conference here recently.

It allows transparency of the design procedure, elimination of non-effective solutions at an early stage and postponement of the hardware/software selection until an appropriate design level has been reached, he claimed.

The multilevel approach consists of five basic steps. It starts with the specification of the information processing problem to be solved, then shifts into an effort to transform the specified information structures into a logical model of the file organization, Solvberg explained.

That is followed by modifying the logical model to fit a particular data base management system (DBMS) and physically implementing the modified model using the DBMS. The process winds up with an evaluation of the final solution using a performance analysis, he said.

The specifications for the problem are gathered in fairly routine ways, but then information is extracted from the analysis to "normalize" the procedure.

The user has to gain a description of the concrete or abstract objects that make up the system and the relationships between the objects. Then he must describe the permanent files (in terms of their purpose) and the retrieval processes to be implemented.

The linkages between file types — "messages" in Solvberg's terminology — are normalized and then the normalized message types are synthesized into a logical model. Finally, the model is modified in order to fit the retrieval requirements, he said.

So far no decision about any DBMS has been made, Solvberg noted. But the logical model is now modified to fit a particular DBMS in the "best possible" ways — by modifying the record layouts and altering the access paths.

Restructuring Approach

Earlier in the session, James P. Fry of the University of Michigan outlined an approach he had developed to cope with the need to restructure a data base once it no longer fit the installation's needs.

Fry said two approaches had been considered and that an "access path" approach to the creation of a restructuring language for network-oriented data bases was selected as the most likely to be effective.

The access path approach, in which all source structures are treated in the same way, is "more naturally suited to complex network transformations," he claimed.

Restructuring is an operation that accesses rather than manipulates data, therefore the operation is unaffected by the logical structure of the data bases, Fry explained.

Thus almost any data base is a valid candidate for restructuring, Fry noted, and there need be no similarity between the source and target data base.

Ledger System Designed for Flexibility

NEWTON UPPER FALLS, Mass. — G/L Plus, the general ledger/financial analysis package from McCormack & Dodge Corp., is described as a highly flexible and comprehensive DP system.

At the same time, adherence to traditional accounting procedures and controls makes it "very user-oriented," a spokesman said.

The system handles multiple corporation processing of financial accounting and statistical data. Journal entries are entered manually or extracted from the output records of supporting subsystems such as payroll, accounts payable or accounts receivable.

The linkage between the user's existing subsystems and G/L Plus is transparent, the spokesman noted.

Coding provided by McCormack & Dodge "translates" the format of the output records into the format needed by the ledger system, performs front-end prorations and allocations, provides offset transactions und consolidates like transactions, he said.

Limitless Reports

Reports generalized in a single pass of the system are vitually limitless since they are parameter driven, the spokesman claimed. The user can specify the formats, the account groups and the reporting structure within the organization to be served by the reports.

Formats of virtually all normal accounting reports have already been coded, so the user has access to them as well as the freedom to shape others as special needs arise, he said.

Repeating journal entries are "warehoused" and each detail transaction contains its own start and stop date. Journal entries may be "diarized" to provide input worksheets for frequently recurring transactions, he added.

Accrual and reversal capabilities are standard. Retroactive journal entries updating prior periods of the same or the previous year are carried forward through all subsequent balances to accommodate post closing entries and restatement of selected reports, he said.

Erroneous journal entries are sent to an error recycle file or optionally balanced through a suspense transaction generation. Turnaround documents are generated to ease correction of errors detected, he explained.

The G/L Plus package consists of 18 ANS Cobol modules which can be implemented on any "moderate" sized IBM 360/30 or larger CPU.

The package now carries an introductory cost of $15,000 for installations willing to be Beta-test sites.

By the end of the year, the standard cost is expected to be in the $40,000 range, the vendor said from 381 Elliot St., Newton Upper Falls, Mass. 02164.

Series/1 Cobol Ready Shortly

ARLINGTON, Va. — Series/1 Cobol is a compiler providing a subset of ANS 1974 specifications for the IBM Series/1 minicomputer. It creates reentrant code to be executed under a run-time monitor, according to the vendor, Advanced Software Products, Inc.

The level of Cobol provided by this system is equivalent to the federal standard for Low-Intermediate Cobol and is similar to other minicomputer Cobols, a spokesman added.

The Series/1 Cobol is said to take full advantage of the Series/1 instruction set and give performance equal to optimized assembler language code on a Digital Equipment Corp. PDP-11/34 or Cobol code on an IBM 370/135.

Up to 65,000 Procedure Division statements and 8M bytes of Working Storage are supported by using virtual storage management, the spokesman said.

Version 1.0 of the compiler running under IBM's Control Program Support is expected to be ready for delivery next month, he noted.

It will require a minimum 32K bytes of main memory for compilations and costs $1,800 for the first site and $120 each for additional sites.

Advanced Software Products can be reached through P.O. Box 992, Arlington, Va. 22216.

Utility Set Supports IBM OS Operations

LYONS, Ill. — Users running under an IBM OS environment can consider a series of utility routines from General Electronics which the vendor claims will allow them to perform functions that are difficult or not now available using IBM's standard utility program.

The Kopy routine, for example, copies lists and provides a list of records copied. Records may be expanded or truncated and reblocked under user control. This $100 utility is described by General Electronics as "10 times as efficient" as IEBGENER.

Doclist is said to prepare printer output from 80-byte text records. This utility supports overprinting for underlining or highlighting and, at $200, is said to be "great" for preparing prototype reports.

"Reformat" reformats data files, permitting rearrangement, deletion, truncation, expansion or reblocking of records. Optional listing of input and ouput records is provided with this $250 package, a spokesman noted.

General Electronics can be reached through P.O. Box 79, Lyons, Ill. 60534.

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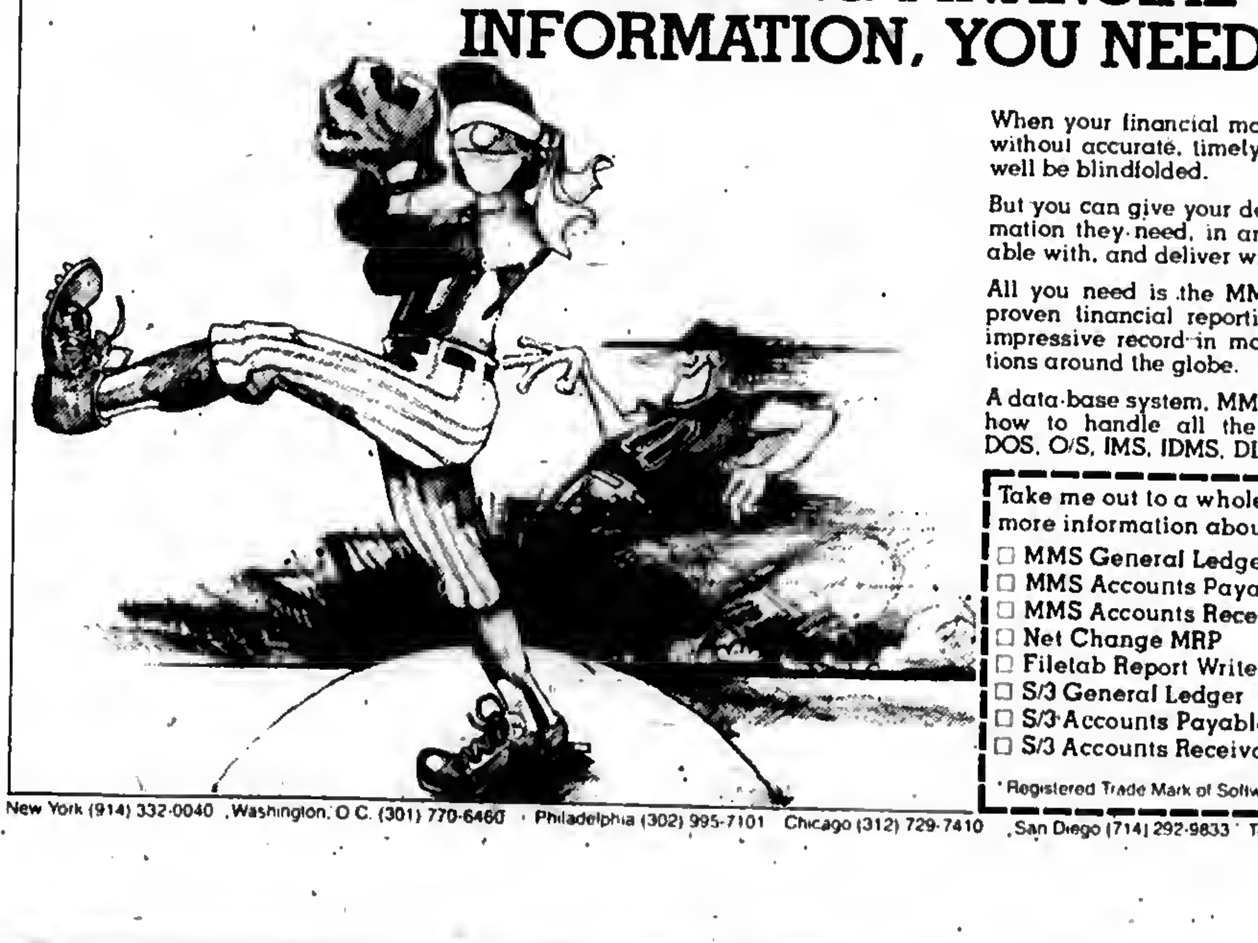

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'Gremex' Helps Teach Management Decision Making

ATHENS, Ga. — The Goddard Research and Engineering Management Exercise (Gremex) system from the Cosmic clearinghouse is a man-machine management simulation game that can be used to depict a project from just after the development of its plan through the final construction phase, according to a spokesman.

Gremex is basically a program evaluation and review technique (Pert) reporting scheme, he said. Unlike usual Pert routines, however, this program does not require the operator to input the amount of work performed in each activity before it can determine the expected completion date of the project.

The package assumes that all activities due to be worked in the current month will be worked. Gremex predicts new durations and costs based on management actions taken by the players and on the contractor's abilities, the spokesman added.

Each activity is assigned cost and duration estimates, but must also be assigned parameters indicating the probability that the estimates will be met and that the project will be a technical success.

Management actions usually can be expected to change these probabilities; reestimating future events and assigning probability factors provides life to the Gremex model, the spokesman noted.

Gremex is not a production job for project management; it poses no "best way" to manage a project but does expose participants to many of the factors involved in decision making when managing a project, especially in a government research and development environment.

A management team can win the game by surpassing cost, schedule and technical performance goals established when the simulation began. The serious management experimenter can use Gremex to explore the results of management methods he could not risk in real life, the spokesman claimed.

Written in Fortran IV for execution in batch mode, it has been implemented on an IBM 360 with approximately 350K bytes of memory available to the user.

Cataloged as program number GSC-11512/CW, the system costs $810. Documentation is available for a separate fee of $8, the Cosmic spokesman noted from 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

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Manufacturers Gain Network Aid

ST. LOUIS — The Advanced Manufacturing, Accounting and Production Systems (Amaps) software from Comserv Corp. will be available to users in the U.S. and Europe through the facilities of the McDonnell Douglas Automation Corp. (McAuto), under terms of an agreement recently signed by the two companies.

The system is said to provide integrated control over the diverse operating departments and functions of a manufacturing company. Its use "solves many of the communications, production and material control problems inherent in a company of this nature," a Comserv spokesman stated.

Amaps consists of nine modules: bill of material, material control, material requirements planning, forecasting, purchasing control, standard cost, capacity requirements planning, process and routing, and shop floor control.

Users on the network will be free to utilize just those parts of the system that are pertinent to their needs, just as users with in-house IBM 360/370s have been able to install those elements they wish, Comserv said.

Comserv is at Metro Office Park, 3050 Metro Drive, Minneapolis, Minn. 55420.

McAuto has branch offices in a number of cities; network headquarters can be reached through P.O. Box 516, St. Louis, Mo. 63119.

Versatec Software Plots Gray Tones

SANTA CLARA, Calif. — Full gray-scale halftones can be produced on any Versatec electrostatic plotter equipped with a specially developed Fortran package, according to a spokesman.

Unlike previous digital gray-scale techniques, the Versaplot Gray Scale software maintains both high contrast and sharp detail, the spokesman said.

Blacks are "100% black," whites are "100% white" and only gray areas are screened, he stated.

The Versaplot Gray Scale software provides "more than 32" levels of gray. "This is more refined scaling than the eye can differentiate," he claimed.

Gray scale is emulated through controlled variation in dot clusters (halftone cells) produced on the electrostatic plotter. With 200 dot/in. Versatec plotters, 40,000 dots are available for each square inch of image area, he said.

Going beyond emulation, the software can be used to modify digital images. Dot clusters, each simulating a halftone dot, can be reshaped in outline, spatial frequency and contour. The user may also select the number of gray levels to be permitted, the spokesman said.

The Versaplot Gray scale package consists of less than 1,000 Fortran statements and can be run on any minicomputer with 16K bytes of memory and a disk file, he added. It may be used by itself or in conjunction with Versatec's generalized Versaplot electrostatic plotting software.

The Gray Scale package is available for a one-time license fee of $1,000, the spokesman noted from 2805 Bowers Ave., Santa Clara, Calif. 95051.

Data Base Dictionary Published by Atsu

BOULDER, Colo. — A directory of interactive data bases, "Data Bases Available to Users," has been compiled and published by the Association of Time-Sharing Users (Atsu).

With descriptions of 250 data bases from 25 remote-computing vendors, the 75-page report is indexed by subject. Among the topics covered are banking, business, economics, education, energy, engineering, finance, science and stocks and bonds, a spokesman said.

Atsu, a 1,200-member nonprofit association, also publishes a bimonthly newsletter called "Interactive Computing" and a two-volume set of directories that cover many aspects of remote computing.

The organization also includes a number of special interest groups and regional user groups which meet at various times during the year.

"Data Bases Available to Users" is part of the two-volume set of directories distributed free to Atsu members, but it is also available separately to nonmembers for $15.

New members are always welcome, the spokesman added from Atsu headquarters at 75 Manhattan Drive, Boulder, Colo. 80303.

Canadian Firm Has APL Planning Course

TORONTO — Assistance in the planning and operation of APL on in-house equipment, regardless of the vendor, is now being offered by Numetrix Ltd. Neither time-sharing vendors nor computer manufacturers can provide the degree of impartiality this independent can, a spokesman claimed.

One of the lines of support Numetrix provides is a modularized APL education and training course consisting of texts, lab and teaching aids. The course is adaptable to meet the needs of the user, whether he is working with an IBM 5100, a Digital Equipment Corp. Decsystem-20 or a Hewlett-Packard 3000, the spokesman added.

Companies using APL for business applications usually start by subscribing to a time-sharing service, he said, but eventually a range of factors — costs, concern about sensitive data, inconsistencies between in-house and outside processing techniques — make consideration of in-house APL necessary.

Numetrix can help evaluate the alternatives and implement decisions on a case-by-case basis, the spokesman stated from Suite 602, 3 Church St., Toronto, Ont., Canada M5E 1C9.

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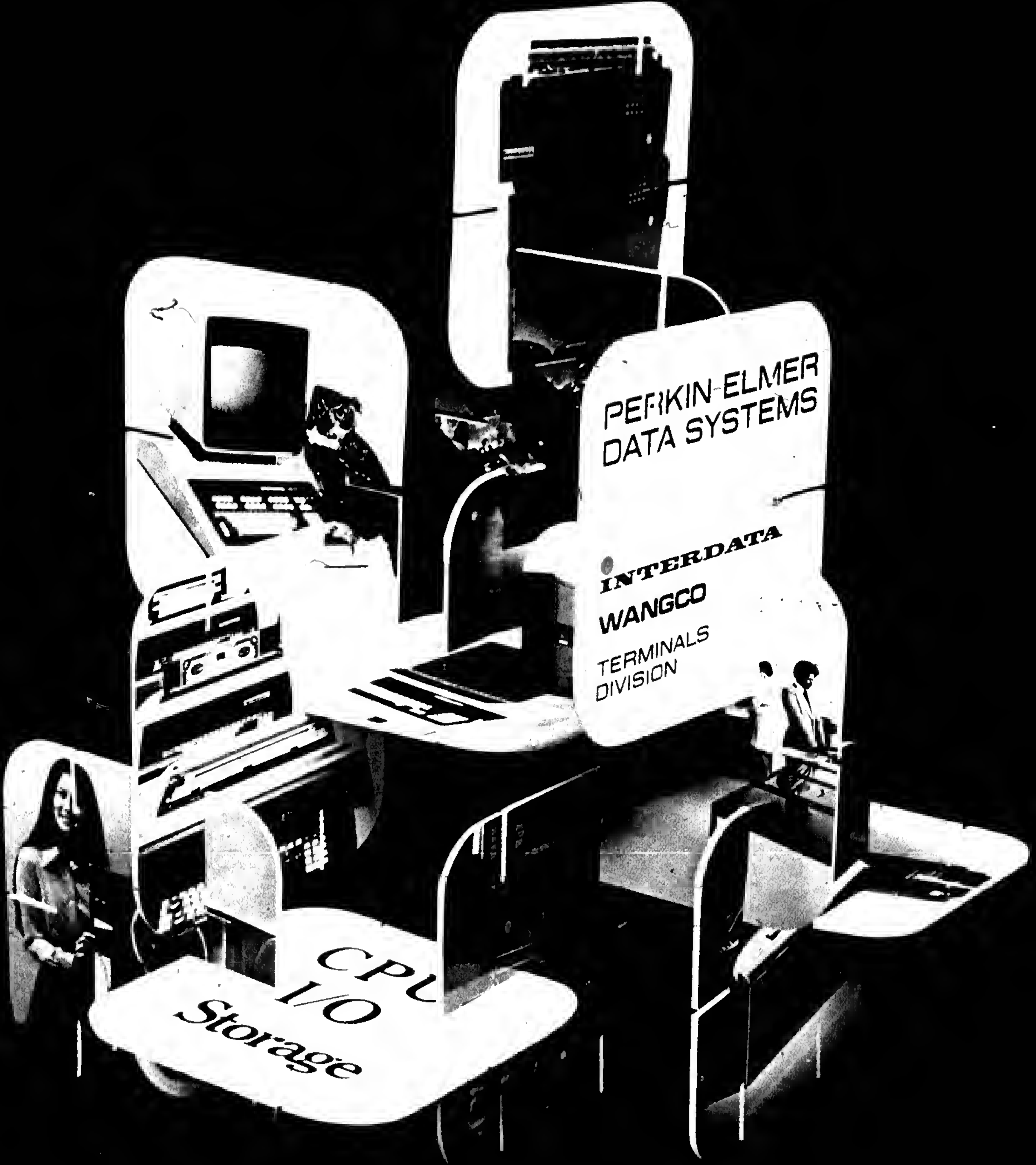

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TCTS Offering Datapac Service on a Commercial Basis

By John P. Hebert
Of the CW Staff

OTTAWA, Ont. — The Trans-Canada Telephone System (TCTS) has made available its Datapac packet-switched data communications network on a commercial basis.

TCTS' formal rate structure for the Datapac digital service was approved last month after being filed with the Canadian Radio-Television & Telecommunications Commission last November, a spokesman noted.

Charges for the service are primarily based on usage, but distance is also a consideration in Datapac's rate structures, he said.

Datapac uses computers to logically control the flow of information between most types of data terminals and remote host CPUs.

Datapac serving exchanges (DSE) have been established in 57 Canadian communities. Users in non-DSE areas can gain access to the network through an off-network access arrangement, the spokesman noted

Incorporates 'Snap'

The packet-switched network incorporates the Standard Network Access Protocol (Snap), which is based on the CCITT X.25 protocol.

TCTS customers using Datapac on a trial basis since last January have become the commercial network's first users, according to the spokesman.

All data on the network is transmitted in the form of packets of up to 256 characters each along intercity Dataroute digital facilities, he said.

At present, TCTS has an agreement with Telenet Communications Corp. and Tymnet, Inc. to provide U.S. users access to the digital service.

By mid-1978, TCTS plans to make the three networks compatible by integrating the X.25 protocol at the switching nodes and upgrading the nodes from temporary to permanent operation, the spokesman stated.

Network usage is primarily determined on a kilopacket transmission volume basis.

Between Toronto and Montreal, for example, data users with intelligent terminals using the Snap protocol will be charged 40 cent/kilopacket, the spokesman stated.

From Toronto to Vancouver, users will be charged 93 cent/kilopacket, while users transmitting data between Toronto and Ottawa will be charged 32 cent/kilopacket, he said.

Terminals not using Snap will require the usage of a network interface machine, which converts the "native mode" data from the terminal into Snap. It costs an additional 25 cent/kilopacket, regardless of distance, the spokesman noted.

A packet priority service on Datapac guarantees immediate transmission of user data and costs an additional 25% more than the normal rates, he said.

A host access charge on Datapac will cost a user $417.50/mo for a 9,600 bit/sec circuit and $60/mo for a 300 bit/sec circuit.

Cost, Control Factors Cited

Firm Scraps Old System for Remote Batch Net

By Esther Surden
Of the CW Staff

PHILADELPHIA — Increased control with a corresponding reduction of costs are two reasons often cited by DP managers for changing from one method of doing business.

These were the same reasons that prompted the management of Acme Markets, Inc. to scrap its potpourri of decentralized older equipment in favor of a remote batch network, according to J.R. Paules, Acme's manager of DP operations here.

Speaking before a recent conference here, Paules explained that prior to developing the net, the firm had a variety of equipment ranging from an IBM 360/40 and three 360/25s to an old IBM 1400 scattered between headquarters and the local divisions.

This decentralized approach led to no standardization of applications software and little control over DP costs, he told the attendees.

The company decided to install a remote batch network because "we wanted to reduce the total costs at the remote locations and eliminate duplicating people at each location, he said. The old equipment, especially the 1400, had become difficult to support and maintain, he added.

The firm decided it wanted to centralize control at the corporate location and implementing such a system takes specified steps, according to Bill Besnier, Acme's group leader for systems programming.

First the user has to decide how the system is going to be used, define I/O volumes and establish when the system will be used. Realistic service levels also have to be set, Besnier said.

Since the remote sites were already doing the applications, there was no need for Acme to theorize volume, Besnier indicated. Daily output figures were readily available and "we also know how long the billing system ran," he said.

The hours during which the system was to be used was established easily since all printing had to be completed by 8 a.m. so reports could be useful. In addition, the firm was "told by management that no terminal can be down for more than four hours," he said.

This requirement was so stringent that if the terminal is down for any length of time the firm will charter a private plane and fly the reports in.

Management also told the department that it would not staff for remote batch operations, he said. Unfortunately, there were few people already on staff with batch experience and because of this is was decided that any terminal chosen had to support IBM 2780 protocol. "It's been around for a long time and is a known," he noted.

Hardware Requirements

The next step was to determine all the hardware requirements, Bensier continued. For example, certain speeds had to be achieved on a card reader, he said.

(Continued on Page 26)

Correction

Omron Corp. terminals and Datamedia Corp.'s 1500 series terminals were rated highest in overall performance in the recent Datapro Research Corp. user survey contained in its report, "All About Alphanumeric display Terminals," [CW, June 13].

Telex Adds Printers in Response to IBM Moves

RALEIGH, N.C. — Telex Terminal Communications has responded in kind to the recent additions to IBM's CRT terminal, cluster controller and printer product lines.

Telex has introduced two printer products which are said to offer the user better price and performance than the IBM 3287 and 3289 printers [CW, May 23].

The firm also introduced a remote, cluster terminal subsystem and Synchronous Data Link Control (SDLC) capability Binary Synchronous Communications (BSC) for the Telex TC 241 and 3270-compatible product line; and price reductions for those 3270-compatible products [CW, June 20].

The Telex TC 287 is a 180 char./sec matrix printer that is said to be a 50% improvement in speed compared with its IBM 3287 printer counterpart. The TC 287 can replace the IBM 3284, 3286 and the 3287 models 1 the 2, according to Telex.

It can be attached to the Telex TC 271 or TC 272 cluster controllers or to IBM's 3271, 3272 or "properly configured" 3274 controllers, a spokesman stated.

Line Printer Capabilities

Telex' TC 289 is a line printer capable of operation at speeds up to 340 line/min — a top speed that is 13% faster than its IBM 3289 Model 2 counterpart, the spokesman said

TC 289s are available with a 64-char. set and can be optionally equipped with a 96-char. set.

The TC 289 can operate on the TC 271 2nd 272 cluster controllers, as well as with IBM's 3271 and 3272 or "suitably configured" IBM 3274 controller, he noted.

The TC 287 printer has 7 by 9 dot matrix characters. It costs $6,250 to buy plus $40/mo for maintenance and will be available in the third quarter.

Telex'TC 289 line printer is priced at $8,750, maintenance costs another $70/mo. The terminal also will be available in the third quarter.

Lease plans from one to five years are available, the spokesman noted, from 3301 Terminal Drive, Raleigh, N.C. 27604.

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Ramtek Adds Graphics Terminal Controlled by Microprocessors

SUNNYVALE, Calif. — Ramtek Corp. has introduced an eight-color graphics communications terminal with microprocessor control of the display and user program areas.

The 6000 Series Micrographic Terminal is said to offer true graphics and high-speed alphanumerics overlay without expensive software development. It is also available in a basic black and white version.

Terminal Transactions

Terminal functions are controlled by a Z80 microprocessor with up to 28K bytes of programmable read-only memory and 16K bytes of random-access memory, the company stated.

A graphics resolution of 512 elements by 256 lines on up to three color planes is complemented by display of alphanumerics in 7 by 10 dot matrices in an 80-char./line by 25-line format, according to a spokeswoman.

The terminal's 128-Ascii-char. keyboard includes 40 function keys and cursor control for both the alpha and graphics screen presentations, the spokeswoman noted.

Transmission speeds from 110- to 9,600 bit/sec; full- or half-duplex operation, parity and on- or off-line operating modes are operator selectable, she said, adding the terminal can operate synchronously or asynchronously.

It also includes an RS-232C or current loop interface.

Options to the 6000 Series Micrographic include a floppy disk interface, additional serial I/O ports, user-defined formats and terminal control software packages:

A basic Micrographic costs $5,400; the black-and-white version is available for $4,700.

The company is planning to offer more applications software packages in 1978, the spokeswoman noted from 585 N. Mary Ave., Sunnyvale, Calif. 94086.

Trivex Has IBM 3775 Replacement

COSTA MESA, Calif. — Trivex, Inc. has announced the Model 0752 stand-alone data entry terminal, a plug-compatible replacement for the IBM 3775.

The terminal supports IBM 3784, 3786 and 3788 printers according to a spokesman. It offers features such as light pen, optical character recognition wand, in addition to user and customer engineer diagnostics.

The diagnostics are able to test the 0752 in the local mode and supply the user with network failure information when on line, he said.

The terminal costs $98/mo on a three-year lease and costs $3,950 to purchase, the spokesman noted from 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

MCS Micro-Based Midas CRTs Support Communications, Editing

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. (MCS) has expanded its CRT product line with the introduction of the Midas II and Midas III terminals, microprocessor-based devices which are said to support communications and text editing functions.

The Midas II has eight selectable transmission rates from 110- to 19,200 bit/sec, can operate in half- or full-duplex modes and supports on-line communications, according to an MCS spokesman.

It can display 24 lines of 7 by 9 dot matrix characters at an 80-character density per line. A 128-character display repertoire is also available, the spokesman noted.

Both terminals include an RS-232 or current loop interface.

The Midas III CRT has the same features as the Model II and also provides full keyboard edit, field attribute edit and a 2K paging option, the company stated.

The terminals are complemented by MCS' line of modular Deskware that reportedly permits users the opportunity to configure their systems.

The Deskware includes a contour-design workstation with a semicircular layout that was designed to increase operator efficiency, according to the firm.

The Midas II terminal costs $1,995 and the Midas III costs $2,245; the Deskware for either is another $230.

On 12-month rental plans, the Models II and III cost $85/mo and $95/mo, respectively, and the modular workstations are an additional $14/mo. MCS is at 525 Executive Blvd., Elmsford, N.Y. 10523.

Matrix Terminal for OEMs Expands Diablo Line

HAYWARD, Calif. — Diablo Systems, Inc. has added the microprocessor-controlled Model 1660 matrix terminal for OEMs to its communications terminal product line.

The terminal features 110-, 300-, 1,200- or 1,800 bit/sec transmission speed capabilities in Ascii code and a ballistic matrix print head with a wide head-to-paper gap.

The 1660's microprocessor helps provide incremental and bidirectional printing, horizontal and vertical tabbing, multiple selectable fonts, control code functions and forms handling capabilities, the firm added.

It prints 7 by 9 dot-matrix characters as well as upper- and lower-case characters and reportedly will print an original plus five or more copies using a 94-Ascii-char. sets, the firm noted.

The 1660 is said to be compatible with Bell 103A, 113A, 202 and 212 modems and other 110- to 1,800 bit/sec asynchronous modems using the RS-232C interface.

An internal print buffer is utilized, eliminating the need for "pad" or time-fill characters, Diablo claimed.

Three switch-selectable interface protocols are built into the microprocessor program which can be used to prevent data loss regardless of paper movement commands or other codes that might interrupt continuous printing operation, it added.

Basic Diablo 1660s cost $2,850 each in minimum quantities of 50 units. The company is located at 24500 Industrial Blvd., Hayward, Calif. 94545.

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IN **SYSTEMS**-HOUSES

Firm Scraps Older Equipment

(Continued from Page 25)

Choosing the communications lines itself was difficult. "We looked at various configurations" and discovered, "once you get high speed, the cost also gets high," he said. Full duplex, 7,200 bit/sec lines were selected.

The control unit that was chosen came from an independent vendor. Acme was not very satisfied with the IBM system available to it because it had no diagnostic ability: Software was a key choice, he added. The code used had to be not only standard but reliable too. Acme decided to stay with IBM's Rtam, he noted:

Because of the directive to minimize outage, the firm had to have redundancy, but couldn't spend any money to achieve it, Bensier said. All the systems involved then had to be easily serviceable or have built-in redundancy, he noted.

Deciding on a Terminal

Choosing the remote batch terminal was also a challenge, he said. After looking in *Datapro* and narrowing down the choices, Acme looked at IBM, Data 100 Corp., Remcon and Harris Corp.

IBM was "eliminated quickly" on the basis of cost, the fact that the 2780 and 3780 could not support the speed the company had determined was necessary, the 2922 was relatively new and Acme did not want to buy a new product, Bensier explained.

Both Data 100 and Remcon were left. Both were 2780-compatible, so the real decision was based on cost. Acme did look at the mean time between failure listed by the vendors, but "I found it very misleading," Bensier said. The user has to evaluate how that number is determined.

The Remcon system, which is now part of CMC a division of Pertec Computer Corp., provided a data compression feature which the firm found attractive.

The front-end processor was the next item to be selected. The DP department eliminated consideration of all programmable front-end processors because it didn't know enough about the communications software, Bensier said.

The choice was limited to a Memorex Corp. 1270 or the IBM 2701 which it found was limited in the number of terminals that could be handled as well as in diagnostic capabilities.

ISC Unveils Monitor, Color Graphics CRT

NORCROSS, Ga. — Intelligent Systems Corp. (ISC) has introduced an intelligent, eight-color terminal with graphics capabilities, in addition to an eight-color video monitor.

The Intecolor 8013 terminal has an Intel Corp. 8080 microprocessor, random-access memory refresh capabilities, a separate keyboard plus special graphics hardware and software. ISC offers a choice of 64 special characters with the 8013.

The terminal also comes with a CRT that can display 48 lines of characters at a density of 80 char./line, in addition to an RS-232C interface, the company added.

A front-mounted access door provides entry to a color convergence board for color setup and registration. Space is also provided for inserting an optional floppy tape and mini disk drive combination for additional storage, ISC said.

The Intecolor 813 monitor has been developed for OEMs and is said to provide systems manufacturers with an effective way to upgrade their systems' terminals to color.

The 8013 costs $3,495. The 813 is sold in quantities of 10 or more and costs $500 each in the minimum quantity, ISC said from 5965 Peachtree Corners E., Norcross, Ga. 30071.

Memorex Unveils Tape Subsystem For IBM 370s

DALLAS – Memorex Corp. introduced a magnetic tape subsystem here recently that includes 1,600- and 6,250 bit/in. tape drives and controllers for use with IBM 370/135 through 370/168 systems.

Memorex's 3220 subsystem – which is functionally equivalent to the IBM 3803 Model 2 and 3240 models 6 and 8 – consists of the models 3226 and 3228 tape drives and models 3221 and 3222 controllers, according to a spokesman.

The subsystem may be configured in several ways, depending on the number of controllers, the maximum number of tape drives and the particular installation requirements, he added.

Both the Memorex 3226 and 3228 tape drives provide dual density capability as a standard feature, allowing either 1,600 bit/in. or 6,250 bit/in. reading/writing to take place without operator intervention, he claimed.

When in read/write mode, the 3226 drive moves tape at a speed of 125 in./sec, yielding a data transfer rate of 200,000 bit/sec at 1,600 bit/in. and 781,250 bit/sec at 6,250 bit/in.

The 3228 tape drive, in read/write mode, will move a tape at 200 in./sec, yielding a data transfer rate of 320,000 bit/sec at 1,600 bit/in. and 1.25M bit/sec at 6,250 bit/in.

Memorex provides two tape controller models, the 3221 and 3222, to permit configuration flexibility, the spokesman said. Each controller contains a microprocessor to translate data, calculate and check the error correction code and direct status information to the system channel, he explained.

The microprocessor checks its own circuits and the tape drives during the machine idle loop. It runs diagnostics on the attached tape drives, he added.

Memorex's 3220 series consists of from one to four 3221 and 3222 controllers and from one to 16 3226 and 3228 tape drives per subsystem, in any combination.

With four controllers, four simultaneous data transfers can occur between any four of the tape drives in the string, the spokesman said.

A typical configuration consisting of one 3221 controller with optional channel switch, two 3226 tape drives and four 3228 tape drives costs $4,560/mo on a 24-month extended-term lease.

The same configuration can be purchased for $221,700 from the firm at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

On-Line System Yields Bonus Benefits for Stores

DES PLAINES, Ill. – Ben Franklin Stores here reports "extraordinary benefits" since going on-line with a system to process vendor invoices for payment.

Cash position improved as did supplier relations. Employee turnover dropped sharply while morale rose and jobs were enriched. Buying and merchandising operations gained in efficiency and management confidence in overall computer support systems increased.

And in addition to all this, annual costs savings are running into tens of thousands of dollars, according to Donald Soderquist, president.

Installed last year, the on-line system unsnarled a mounting logjam in the matching of incoming invoices against open orders – a chore that is especially vital at Ben Franklin, Soderquist said.

However, he added, the impact of the "Controlled Order Invoice Network" (Coin) now extends well beyond the confines of the accounting department, reaching into many aspects of a dynamic business.

Liability Becomes Asset

"With the Coin, we turned a departmental liability into a business asset," Soderquist noted.

"In addition to solving a serious problem, we accomplished more with this system than we had ever anticipated. We now have the capability to cope effectively with a rapid growth pace that we expect will speed up more in the immediate future," he added.

Growth waa a principal factor in creating the invoice matching problem that had plagued the operation for some time. Ben Franklin, a division of City Products Corp., is embarking on a store franchising expansion program.

The expansion push is expected to add a minimum of a million square feet of retail store space annually, Soderquist said.

Along with the store expansion has been a steady growth and diversification in merchandise lines. With more stores to service and more merchandise to buy, the invoice matching workload reached gigantic proportions involving as many as 2,500 invoices a day, Soderquist pointed out.

The sheer size of the problem was compounded early in 1974 when Ben Franklin centralized all invoice and accounts payable processing for the eight distribution centers at division headquarters here.

'Severe Bind'

"With the centralization and the growing workloads, we got into a severe bind," James Battista, accounting systems manager, recalled. "Although our computer systems were sophisticated, our method of data input was archaic."

As a result, the activity of matching vendor invoices to Ben Franklin purchase orders – a necessary function to put them in line for payment – began to fall far behind the desired pace. The bottleneck steadily tightened to the point where it was taking as long as 18 days to clear invoices for closeout, Battista explained.

Changing a simple accounting routine like invoice matching would not seem likely to produce widespread advantages. Yet, at Ben Franklin Stores, going on-line with invoice matching has changed a department liability into a business asset.

The delays in invoice matching were unacceptable to management because of the importance the division places on taking full advantage of vendor discount opportunities. But there were other aspects of the problem.

The logjam proved self-perpetuating as the tempo of vendor inquiries requiring invoice receipt and payment status stepped up, creating more paper shuffling and information searches.

Labor costs in the department skyrocketed as more people were hired to handle the heavy workloads, and employee morale plummeted because of the menial types of processing activities involved with the manual invoice matching procedures, Battista stated.

"This situation grew so bad that there were some months in which we experienced a 100% worker turnover," he said.

In late 1974 the decision was made to "go on-line" with the invoice matching procedure, eliminating the hard-copy retrieval of open orders and the manual comparing of invoice and order details, according to Ron Walters, manager of DP.

This was accomplished by linking IBM 3270 visual display terminals to the IBM 370/145 CPU. The on-line hookup permits terminal display of any record on a processor-maintained open order master file, he noted.

The file record is created at the time the Ben Franklin purchase order is issued and is complete in all details, Walters said. Terminal operators can access the open order file by purchase order number, by merchandise item number, by vendor number or by promotion code.

Ten of the terminals located in the department are dedicated to invoice matching. Using the terminal and the Coin program, the operator can complete the matching and close out an invoice for payment in a matter of minutes.

Programming for Coin is such that the terminal operator is guided through every step of the invoice closeout procedure by means of instructions appearing at the bottom of the screen display.

"We designed the new system for ease of use and for positive control," Walters explained. "The computer itself makes all needed calculations for price extensions, discount and tax amounts.

"In the event of a terminal shutdown for any reason, the system will keep track of all prior transactions and then pick up where it left off when the terminal comes back on-line.

"Also, the Coin system interfaces with our purchasing system on the one end and with our accounts payable system on the other," he noted.

Ben Franklin is now saving thousands of dollars a month by taking full advantage of vendor discounts, Walters reported. Supplier relations, which had been deteriorating because of slow payments and difficulties in obtaining invoice status information, now are improved, he noted.

Labor cost savings in the invoice matching function are substantial, he said. The staff has been reduced from 31 to 10 employees despite the fact that invoice volume is higher by some 10%.

Dataproducts Adds Four Printers With Varying Print Technologies

DALLAS – Dataproducts Corp. introduced four printers here recently, each utilizing a different print technology:

The B-180 and B-300 line printers, which utilize a hammer and band technology; the M-200 impact matrix printer, which uses a dual column 14-wire head; and the T-80 thermal matrix printer made up the Dataproducts offerings.

The B-180 and B-300 line printers uses a steel-band font carrier and microprogrammed control to produce 180- and 300 line/min throughput respectively, according to a spokesman.

Both printers use the same font carrier bands, each holding 208 characters with a reported life of more than two years use in a typical application, the spokesman said.

A band-edge guide system provides adjustment-free vertical print registration and reportedly eases band changes, he claimed.

The printer electronics are centered around a microprogrammed controller that utilizes bit slice architecture. A butilt-in test feature enables tests to be run independently of host devices and a diagnostic display indicates the cycle the printer is in should failure occur, the spokesman explained.

Both printers use a stepper motor paper feed system to provide a slew rate of 15 in./sec. They both handle up to 6-part industry standard forms from 3- to 15 in. wide and up to 14 in. long, the spokesman said.

They will print at either 6- or 8 line/in. and will print to the bottom of the last form, he added.

Dataproducts will begin deliveries of both units in early 1978. The B-180 will be priced under $3,000 and the B-300 will be under $3,300 in OEM quantities, the spokesman said.

The M-200 uses a dual column 7 by 7 half-dot matrix font and a logic-seeking lookahead feature to product 320 char./sec in a bidirectional print mode, according to the spokesman. Users can expect throughputs ranging from 125 line/min with a 132-char. line to 300 line/min with shorter, 40-char. lines, he added.

132 Print Positions

The M-200 produces the standard Ascii 96-char. set plus an additional 32 commonly used international characters. It offers 132 print positions and can handle up to 6-part forms, he continued.

The 14-wire dual-column print head offers optional character spacing for condensed or expanded printing. The firmware controlled option permits user selection of 16.7-, 10-, 8.3- or 5 char./in.

The M-200 has a mean time between service calls of at least six months at a rated workload of 8.5 million char./mo, he claimed.

The unit will be available for deliveries in the second quarter of 1978. It costs under $2,000 in OEM quantities, he said.

Thermal Matrix Printer

Dataproducts T-80 is an 80 char./sec 80-column thermal printer that utilizes a 5 by 7 dot matrix for printing and a 7 by 7 dot matrix for plotting.

The unit has an 80 msec/line slew speed and incorporates a single-head print mechanism.

The T-80 will be available for delivery in May 1978 and costs $940 in OEM quantities, the spokesman said from 6219 DeSoto Ave., Woodland Hills, Calif. 91365.

Protecting the DP Center — Part 4

Contingency Planning Minimizes Emergencies' Impact

By Irving M. Cruper
Special to Computerworld

An emergency situation should not seriously impede the continued operation of required electronic DP.

The planning for continuation or resumption of operation should include:

- A program to protect records in accordance with their importance.

This is the conclusion of a four-part series on physical security of the computer center by Irving M. Crupar of the Wackenhut Corp. The series is extracted from a chapter in the Automatic Data Processing Handbook, *copyright 1977 by McGraw-Hill, Inc.*

In his conclusion, Crupar takes a look at contingency planning for continued computer center operations following an emergency situation. In past weeks, Crupar has discussed security needs, fire protection and electronic detection devices.

- An analysis of the workload and the effect upon continuity of operations, organized for each computer facility.
- Arrangements for emergency use of other installed computer equipment to cover plans for transportation of personnel, data, and supplies to an emergency computer location, in addition to agreements and procedures for the emergency use of the computer equipment.
- Programs designed with an adequate number of checkpoints and restarts to ensure rapid recovery to normal operations.

Personnel Instructions

All personnel should receive continuing instructions and review in:

- The method required for turning off all electrical power to the computer under both normal and emergency conditions.
- Turning off the air conditioning in the area.
- Alerting the fire department or company fire brigade.
- Evacuation of personnel.
- The location and proper operation and application of all available fire-extinguishing and damage control equipment, including automatic detection and extinguishing equipment. Computer-room personnel should be fully trained in carbon dioxide usage through actual operation of the equipment on a practice fire.
- The importance of records and their storage requirements.

A written emergency fire plan should be prepared for and posted at each installation, assigning specific responsibilities to designated personnel. The following major items should serve as a guide and are suggested as minimum features of this plan:

- Remove all power to the computer system. Provide a means, such as a main-line circuit breaker or equivalent. Provide a remote control for this purpose near the operator and next to each of the exit doors.
- Shut down the air conditioning system. This should be done if the main circuit breaker does not control the air conditioning system. Emergency means similar to those for the computer system should be provided.
- Notify proper authority. Building fire brigades should be notified immediately and outside fire-fighting companies should be called immediately to assist.

If the electronic equipment or any type of records are wetted down, smoky or otherwise affected by the results of a fire or other emergency, immediate action should be taken to clean and dry the electronic equipment.

If the water, smoke or other contaminations are permitted to remain in the equipment longer than absolutely necessary, the damage may be grossly increased.

Microelectronics Seen Directing Hard Copy's Future

By Frank Vaughan
Of the CW Staff

DALLAS — The future of hard-copy output devices depends on the utilization and enhancements of microelectronics, new materials and new manufacturing processes, as well as user's needs, according to Irving L. Wieselman of Dataproducts Corp., Woodland Hills, Calif., a manufacturer of such devices.

Speaking at a recent National Computer Conference session entitled "Output-Results and Rhetoric," Wieselman discussed hard-copy computer output and its future:

The principal hard-copy output of computer systems is alphanumeric data produced on computer output printers that range in speed from 10 char./sec to 18,000 line/min. The prices range from less than $1,000 to $300,000, Wieselman said.

Printers are classified by three characteristics: impact or nonimpact, character or line printer, shaped or dot-matrix characters, he explained.

In addition to hard-copy printers, there are three types of plotters in general use: the drum, flatbed and electrostatic, Wieselman said.

Certain types of computer output printers can be used for plotting if the printed symbol spacing can match the plotting requirements. Plotters are utilized for hard copy whenever graphical data is the prime output of the computer, he noted.

The particular choice of a hard-copy output device for a given system depends on the application, the print quality and/or graphic output requirements, the output volume, the speed of data availability and output speed capabilities, he said.

Additional criteria are the flexibility and availability of output character sets and symbols, system costs, expendable costs and the maintainability and reliability, he pointed out.

Various Technologies

In his discussion of hard-copy output devices, Wieselman discussed the various technologies that are generally being used.

The changes in price/performance for existing products in the past few years have primarily resulted from improvements in large-scale integration (LSI), new materials technology and production automation, he stated.

Products using new technolgies, such as ink-jet printers and laser beam electrophotographic printers are based on the refinement of new inventions and concerted investment in new development, he said.

The expanded use of LSI and the emergence of microprocessors have not only made dramatic improvements in existing products, but have also affected the way in which we conduct our day-to-day affairs, he added.

Use of Microelectronics

The use of microelectronics in hard-copy output equipment has not only reduced the cost of electronic control. It has provided more flexibility and increased use of electronics to perform functions which were previously handled by mechanical or electromechanical equipment, Weiselman said.

The reliance on a paper-tape reader for vertical format control was replaced by Dataproducts when lower-cost shift registers became available, he said. The firm plans to replace these with microprogrammed logic to provide additional flexibility, he claimed.

Dot matrix formed characters, which have the appearance of being produced from shaped character impact fonts, are possible because of the lower cost of storage. The IBM 6640 uses a dot structure of 24 by 40 (960 dots) now, as compared with other dot structures as low as 5 by 7 (35 dots), to produce characters, he said.

Cheaper Production

Possibilities for lower-cost production techniques using more plastics and less metal are emerging in products in the marketplace, Weiselman indicated.

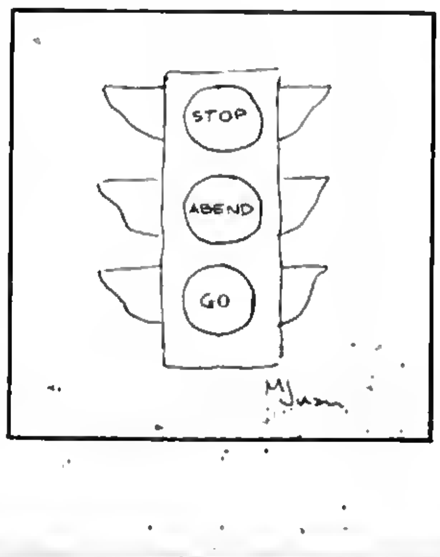
New magnetic materials are available which provide magnetic fields 50% stronger than those currently used, while new plastic materials and epoxies also mean lower cost mechanisms, he said.

The emergence of the laser beam as the energy source for character generation has affected both nonimpact and impact printing. The very high-speed impact printers will use laser character generation and other printers beside IBM's have recently been announced, he noted.

Ink-jet printers had been in the marketplace, but they were not successful because of reliability problems and non-competitive price/performance ratios, he explained.

IBM decided to invest in ink-jet technology and found solutions to many of the problems causing poor reliability. The electronic sophistication required to produce the high print quality of the IBM 6640 could only be possible with the use of microelectronics today, he added.

The use of finer dot matrix structures has also had an effect on graphical output, he said.



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PUBLIC RELATIONS

Senior journalist with excellent business/trade contacts and writing skills. Should have experience writing and placing articles about technical products and markets. Ideal candidate will have 5-10 years experience, preferably in the computer and/or electronics industry.

ADVERTISING SUPERVISOR

Will be the prime liaison between Data General and Ingalls, for all business and trade advertising in support of the company's marketing activities. Should have excellent understanding of creative process, developed by 7-9 years advertising contact experience in agency and/or a corporation. Also needs solid understanding of electronics/computer industry.

SALES PROMOTION ACCOUNT SPECIALIST

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Mini Bits

BTI Business System Gets Increased Disk Capacity

DALLAS — Basic Timesharing, Inc. (BTI) has enhanced its minicomputer business time-sharing system with the introduction of a 10M-byte non-removable disk drive, a heavy duty 3M Co.-type cartridge tape drive and a line of printer options.

The 10M-byte disk replaces a 7.5M-byte Diablo-type drive previously available for the system. The increased capacity was given at no charge to the user, a spokesman said.

In addition, the firm is shipping a 3M-type cartridge tape drive that runs at 6,400 bit/in. as a backup medium.

A 300 line/min, 132-col, 96-char. medium-duty line printer and controller costs $8.950.

A heavy-duty 300 line/min, 136-column 64-char. unit that includes a vertical forms unit, static eliminator, active ribbon deskew, paper motion sensor and paper holder costs $8,950.

A 600 line/min version costs $18,500, while a 900 line/min unit can be purchased for $23,700.

Basic Timesharing is at 870 W. Maude Ave., Sunnyvale, Calif. 94086.

AIIE to Host Conference On Mini Applications

NEW YORK — A conference on "Minicomputers — the Applications Explosion" will be held here July 18 to 20.

Sponsored by the American Institute of Industrial Engineers (AIIE), the conference is addressed to executives and professionals concerned with current and potential applications of minicomputers either from the DP or the user point of view, a spokesman said.

The conference costs $265 for AIIE members and $295 for nonmembers.

Information is available from AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Short Course to Examine Personal, Micro Systems

JAMAICA, N.Y. — St. John's University here is offering an intensive short course on personal computers and microcomputer-based business systems.

The course will review the state of the art in current microcomputer technology including both hardware and software design as well as numerous applications of personal computing in education, recreation and business.

It will meet every Tuesday from 6 p.m. to 8 p.m., Sept. 27 to Oct. 18, and will cost $29. For further information contact Dean Patrick Basilice, Evening Division, St. John's University, Jamaica, N.Y. 11439.

While Constroversy Rages

Minis Help Nuclear Waste Researchers

By Esther Surden
Of the CW Staff

IDAHO FALLS, Idaho — While controversy rages over the environmental impact of nuclear energy, scientists at Allied Chemical Co. here, armed with desktop minicomputers, are trying to find an effective, economical alternative to present methods of handling nuclear wastes.

With environmentalists concerned about the dangerous waste products left after the uranium is processed and energy conservationists worried about the inefficient use of fuel, studies here could have a wide-ranging impact.

"The object of our research is to verify the various processes that put it [nuclear waste] in the form of solid waste rather than liquid waste and to demonstrate that these processes can be done safely with a minimum impact on the ecological system," acording to Dr. Harry Lawroski, assistant general manager of the Idaho Chemical Program at Allied.

Another object is to "recover the uranium, which is very valuable," he added. With some modification, the techniques developed at the lab can be applied to other nuclear installations. "We are proving these techniques — proving that they can work and they have worked," he stated.

All the fuel used in the experiments at Allied "comes from the Energy Research and Development Administration — from research reactors at universities, for example," he said.

Laboratory Uses

The desktop minicomputers are used in laboratory operations ranging from chemical analysis to budget monitoring. Some of the systems are interfaced to monitoring and data acquisition instruments such as mass spectrometers, flame spectrometers and pulse height analyzers.

"Ten percent of our 550 employees do their own programming," according to Harry Deveraux, group leader for instrumentation applications.

"The presence of portable computing systems allows chemists to get on-line quickly and solve problems without the waiting experience associated with single large systems. Nontechnical people can also run programs and acquire meaningful data," he added.

Allied uses 12 Hewlett-Packard Co. systems including one HP 9810, eight 9830s and three 9825s. The systems were purchased as a result of a bid situation, according to Lawroski.

Typically, the systems are used to control instruments. In one application, for example, a system is interfaced to a carbon rod-type atomic absorption spectrometer, Lawroski said. Small carbon rods are charged with the elements under study.

Through the interface, the system controls heating the rods at rates up to 300 degrees C per second. While the sample is atomized, the system acquires and evaluates the resulting data.

Another system is used for effluent studies — tests which look at various types of radioactive fission products, seeking ways to contain them.

A recent test determined the durability of crystalline zeolite, an encapsulant medium for radioactive krypton, for example. The system evaluated the leak rate of the crystals at various temperatures and pressures.

Nuclear plant simulation is also an important part of Allied's research, according to Dr. John Baldwin, supervisor of Allied's Analytical Research Section.

Plant design and utility routing must consider system safeguarding as well as structural factors, Baldwin said. Such a seemingly simple operation as routing a pipe becomes complicated when the transported material is radioactive. The smallest leak can have serious consequences.

Desktop system monitors mass spectrometer at Allied Chemical Co.

"The interfacing computations were designed to accomplish two things: to reduce the possibility of human error and to save the chemist from the tedious process of manually collecting and analyzing data," Baldwin explained.

ICL Offers 220 Series CPU As Singer System Ten Upgrade

By Esther Surden
Of the CW Staff

EAST BRUNSWICK, N.J. — ICL, Inc. clarified its commitment to the Singer Business Machines System Ten user base last week with the introduction of the 220 series, described as an upgrade path for those users.

The ICL-developed processor features the same design principles as the earlier System Ten series processors but with a faster processor cycle time than its predecessors in the 110 series. Core capacity and disk handling facilities have also been enhanced on the 20, according to a spokeswoman.

The system "protects the investment" of current System Ten users because they can run their software and peripheral devices on the 220 without modification, the spokeswoman said. In addition, "many existing processors can be upgraded" to become the Model 220 system, she added.

The ICL 220 CPU is already available to European and South African users. It is designed for the same type of user who used the System Ten — those primarily concerned with business applications such as order processing, invoicing, accounting.

The core memory capacity of the system has been increased from a maximum of 110K 6-bit char. to 160K char.

The System Ten processor consists of fixed hardware partitions with each partition's core size determined and set in the field.

Up to 20 partitions can be handled by the system, but the maximum memory size of each partition on the older processor was 10K char. With the enhancements, each partition can accommodate up to 80K char. of memory.

Memory locations in common to all users have been increased from a maximum of 65K char. to a maximum of 80K char., the company added.

To upgrade peripheral capacity, the company introduced two disk drives. The Model 43 is a fixed/removable device with an 8M-char. capacity, while the Model 44-3 is a 20M-char. drive.

Total on-line disk capacity for the system has increased 60% to 160M char.

Software enhancements include improvements to the Disk Management System, DMF2, which are said to take advantage of processor improvements to increase data management efficiency. The company will also provide enhancements to the assembler, sort functions and RPG-II software on the system.

A typical ICL system with 20K char. of memory, a 1920-char. CRT, an 8M-char. disk drive with 4M fixed and 4M removable and a 165 char./sec serial printer costs $39,000.

A model with a dual disk pack with 8M char. of removable disk pack costs $36,500, a spokeswoman said from the firm at Turnpike Plaza, 197 Highway 18, East Brunswick, N.J. 08816.

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"Very impressive... Itel's Advanced System was installed and fully functional within three hours and fifteen minutes!"

Kenneth Garrison, Vice President,
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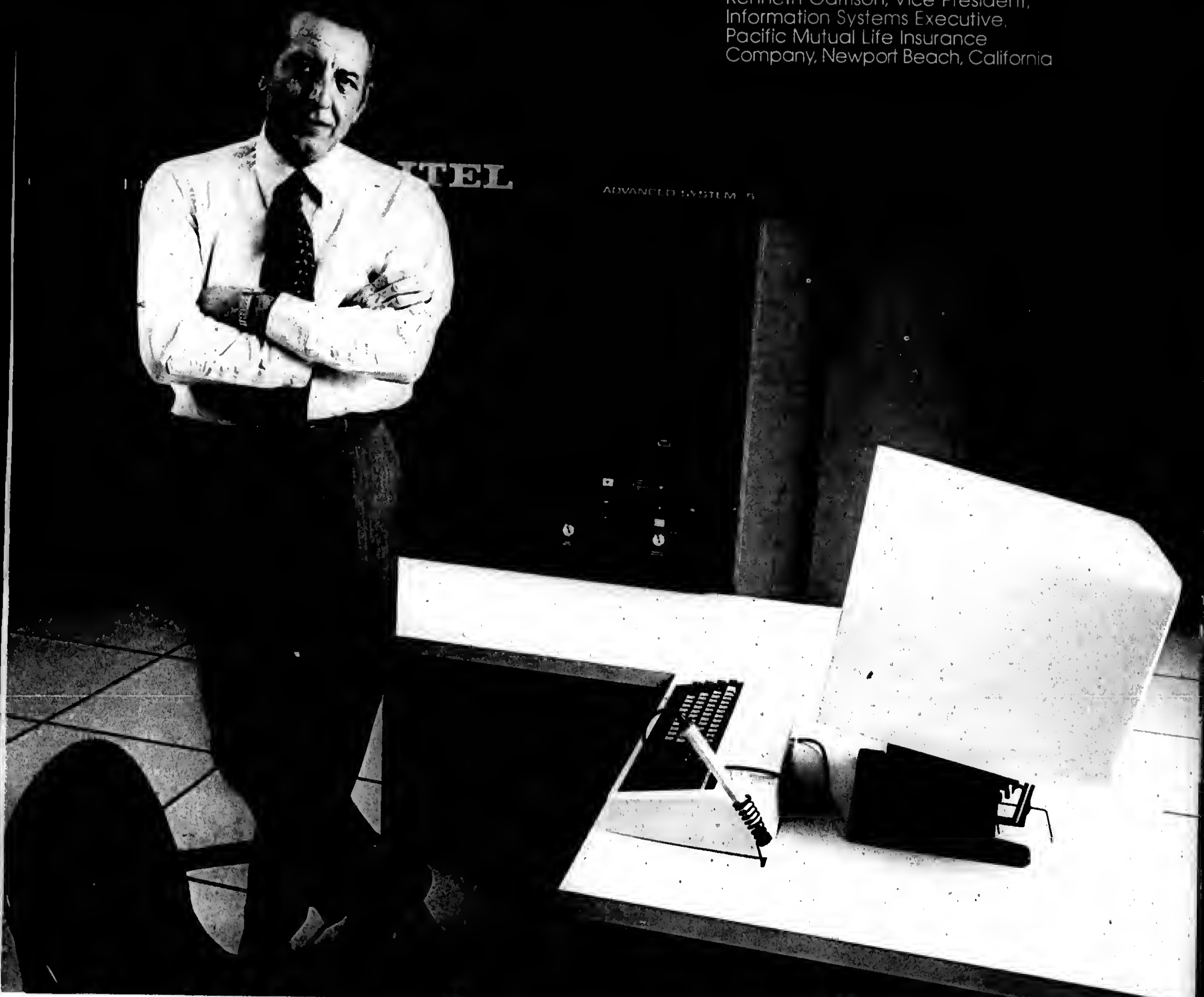

"Itel's record installation time was outstanding, especially when ours was the very first Advanced System to be installed. And its performance has proven to be as impressive as its installation.

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"Also contributing to our decision was the fact that the Advanced System would protect our investment in programming, documentation and personnel training. So, not only did we save on initial cost, but we're saving money in the long run, too.

"Choosing the AS-5 was a good move—we've been thoroughly pleased with the Advanced System and with Itel every step of the way. We sincerely feel that Itel deserves every accolade possible for the quality and reliability of their Advanced System, and the quality and professionalism of their people."

"Incredibly enough, we made no software changes at all when we put the Itel Advanced System™ into production."

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Dr. Clair G. Maple, Director of
Computation Center, Iowa State
University of Science and
Technology, Ames, Iowa

"We're thoroughly pleased with the AS-5. Installation was completed with remarkable speed, and its performance has been outstanding. We're quite proud that Iowa State is the site of Itel's second Advanced System installation.

"We were initially receptive to the AS-5 because there seemed to be economic advantages involved. We saw the opportunity to replace the IBM 370/158 and to increase memory size, add secondary storage, upgrade our magnetic tape system and modify the CPU to a model III, all within a price range we could afford. And to be able to do all that without software modifications and without utilizing more space is positively remarkable.

"Here at the university, our Advanced System has between fifteen and twenty thousand users. It handles a wide range of activities–from course-related student programs to university-generated academic research. And its performance has been very impressive.

"In fact, we've been very favorably impressed in all areas of contact with Itel–from the outstanding performance of their products to the professional standards of their personnel and the excellence of the service they've given us."

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Harris Broadens 1600 Series Offerings

DALLAS — Three miniprocessors, two key-to-disk software packages and auxiliary memory have been added to the Harris Corp. 1600 family.

The three processors - the 1650, 1660 and 1680 — are filed-upgradeable from the existing 1610 and 1620 processors.

The 1600 family can integrate batch and interactive hardware and software into a single, centralized, controllable system, Harris claimed.

The 1650 processor, primarily intended for key-to-disk data entry applications, can operate up to eight key entry terminals concurrently with remote job entry communications to central host computers. Its memory is expandable to 96K bytes, according to the firm.

The 1660 can perform a variable mix of remote job entry, batch Cobol, key entry and interactive applications.

The 1680 is a dual-processor configuration that enables a user to combine any two 1600 family models into a single unit.

The auxiliary memory is available in 16- and 32K-byte increments and is said to enable 1650 and 1660 processors to be used in 64K-, 80K- and 96K-byte configurations.

The key-to-disk software packages introduced — Format/10 and Format/41 — enable a 1600 system to process intermixed format- and program-driven applications, the spokesman added.

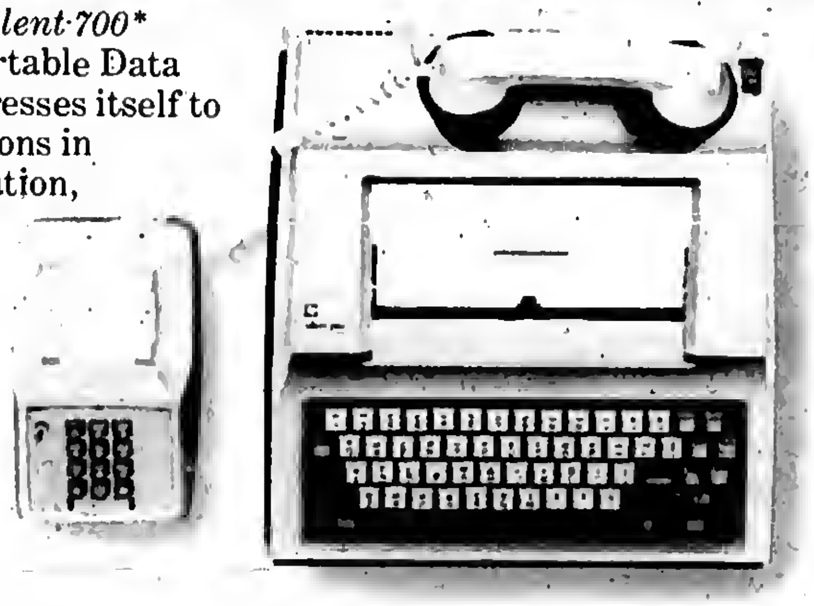
Typical System Prices

A typical Harris 1650 system including four key stations, 64K of memory, a 6M-byte disk, a 300 line/min printer and 9,600 bit/sec communications leases for about $1,770/mo including maintenance and sells for $60,720.

A 1660 with eight CRTs, 96K of memory, a 12M-byte disk, a 1,200 line/min printer and transmission handling capabilities up to 19.2 Kbit/sec costs about $3,572/mo, including maintenance, and can be purchased for $128,888.

Pricing for a 1680 depends on the processors combined and the configuration, Harris noted.

The Format/10 software, the processors and auxiliary memory is available now. The Format/41 key-to-disk software is scheduled for release in July and the 1680 dual processor is slated to be available in August, Harris said from 11262 Indian Trail, Dallas, Texas 75234.



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The 745 with APL features half or full duplex operating modes. Standard parity options. And ASCII/APL keyboard. With readable font, true underscore and real back-space key.

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TEXAS INSTRUMENTS.

Vendors' Units Micro-Based

DALLAS — Several vendors brought user-oriented microprocessor-based systems to the recent National Computer Conference here.

The Mupro-80D introduced by Mupro, Inc. is a microcomputer-based system with a floppy disk drive.

Designed as a general-purpose system or for software development, the system supports multiple terminals for simultaneous program development by more than one user, Mupro said.

The system runs the Mute software package, described as a disk operating system that supports the firm's Bsal-80 software consisting of a relocating block-structured assembler, linking loader and text editor.

A 32K-byte Mupro-80D costs $7,900 from the firm at 424 Oakmead Parkway, Sunnyvale, Calif. 94086.

Personal System

Micromega Corp. unveiled its Micro M16, described as a fully assembled and tested 16-bit personal system.

The system can accommodate up to 60K 16-bit words of memory contained on boards that can be populated with 32K bytes. The CPU is a National Semiconductor Corp. Pace microcomputer that features six vectored priority interrupt levels and a buffered 16-bit address/data bus.

Software includes Pace Basic, an 8K macro assembler that generates relocatable and linkable code, a conversational editor, a linking relocating general loader, a debug program and a "mini-monitor" which writes onto cassette, loads from cassettes, scans memories and executes from start address, the company said.

Micro M16 costs $3,750 from the firm at Suite 12, 1131 Stemmons Freeway, Dallas, Texas, 75229.

Ehnek, Inc.'s Ehnek 77 is based on the TMS 9900 from Texas Instruments. A basic system includes 16K bytes of random-access memory and a 4K-byte operating system stored in erasable programmable read-only memory.

A cassette tape transport and video graphics terminal are also included in the basic system, the firm said.

An Ebnek 77 can be interfaced to standard peripherals. Memory can be expanded to 128K bytes in the system's cabinet.

The system costs $3,800 assembled, the firm said from 254 N. Washington, Wichita, Kan. 67202.

COMPUTER INDUSTRY

CI Notes

Commerce Nixes CDC Sale Of Cyber 76 to Soviets

WASHINGTON, D.C. — The Commerce Department has blocked the sale of a Control Data Corp. Cyber 76 to the Soviet Union on grounds it could be put to military use.

CDC termed the denial "political."

The export license was denied "because [the Cyber] is far more powerful than any computer known to be available to the Soviet Union [and therefore] the likelihood of diversion to military or strategic uses is of serious concern," according to Commerce.

Safeguards to detect and prevent such diversion "were found completely ineffective by a government task force," the department added.

The computer was ordered in 1975 for weather research.

"We believe the Administration decision is essentially political rather than being based on sound technical grounds," a CDC spokesman said. "The decision is not surprising in view of the recent, almost daily, leaks of selected negative data from the evaluation personnel's classified report.

"Although it is couched in terms to indicate a thorough study was done, the decision was based on very narrow grounds that we believe will not stand up to close examination," he said.

CDC may appeal the decision, he added.

Memorex Makes STC an Offer

SANTA CLARA, Calif. — Memorex Corp. has made a formal offer to acquire Storage Technology Corp. (STC).

Memorex offered to exchange .725 share of its common stock for each STC common share. Based on Memorex's closing price on the Pacific Stock Exchange, the offer is valued at about $75.5 million.

STC is considering the offer, but indicated an agreement in principle has not been reached yet.

AMI, German Firm Ink Pact

SANTA CLARA, Calif. — American Microsystems, Inc. (AMI) and Robert Bosch GmbH have signed a five-year joint development agreement under which AMI will design metal oxide semiconductor parts for Bosch's products.

In addition, Bosch will acquire 747,000 shares of unissued authorized-buy AMI stock for about $14.2 million, thereby acquiring 25% of the U.S. firm.

Wema Cancels Show

PALO ALTO, Calif. — The Western Electronic Manufacturing Association (Wema) has cancelled plans for Microfair '77, a combined educational seminar/product exhibit originally scheduled for this October.

Wema Chairman Kenneth Oshman said he was advised by executives of Fairchild Camera & Instrument Corp., Intel Corp., Motorola, National Semiconductor and Advanced Micro Devices that their firms are not interested in the show.

Chief executives of these five semiconductor companies recently announced formation of a new Semiconductor Industry Association, but said at that time they would continue membership in Wema as well.

Supershort

ISI Establishes Service Group

Information Science, Inc. has established a National Banking Group to supply computer-based human resources systems and consulting services to banks and financial firms.

Investors 'Overreacted' to IBM

DP Stocks Seen Rebounding by Year-End

By Molly Upton
Of the CW Staff

NEW YORK — Although the DP industry's stocks are performing below those of the Standard & Poor and Dow Jones Industrial averages, this should change in the latter part of the year and into 1978, according to a report from L.F. Rothschild & Co., a brokerage firm here.

The investment community appears to have "overreacted" to IBM's mainframe and memory pricing adjustments and announcements, the report said.

IBM's action differed little from past moves, the report indicated, "but the way it has been done has confused the outside observer.

"One could speculate that, had IBM advertised its new equipment as another generation and introduced it somewhat earlier, the stock market would be greeting the announcements with as much enthusiasm as computer users," the report continued.

Recovery Delayed

Rothschild postponed from 1977 to 1978 the time during which the DP industry would equal or outperform the Standard & Poor averages for three reasons.

These included downward revisions in 1977 earnings projections, especially for IBM and Burroughs; the skittishness of investors caused by the recent IBM announcements; and investor disenchantment with low-yielding multinational companies in general.

As reasons for its belief that the industry's stock performance will rebound, Rothschild cited the strong order rates of both minicomputer and mainframe firms and increased demand, especially for memory, as a result of lower prices, increased applications and the move to distributed processing.

Furthermore, "we believe that IBM's efforts to 'relocate' whatever profits may have been lost [from mainframes and memories] to other areas within the total systems bundle will prove manageable for IBM's major competitors," Rothschild remarked.

The total systems competitor that offers hardware, software and services "will have sufficient flexibility to take advantage of the higher price umbrella IBM is creating in such areas as field engineering services and software changes," the report observed.

In addition, customer defections from a manufacturer are expected to be "relatively modest on a net basis" as in the past, the report stated.

Time to React

IBM's competitors should have some time in which to formulate reactions because at least 70% of the non-IBM installed rental base is covered under three- to five-year leases, according to the report.

"True, IBM's price adjustments on existing installations will result in some near-term revenue and profit dislocations for the other mainframers as they follow IBM's lead and selectively reduce prices. However, the more important consideration for the longer term is preservation of the customer base," the report said.

The actions by IBM are not solely indicative of a price war, although they were made partially in response to competition from memory and plug-compatible CPU makers, the brokerage house indicated.

The moves principally reflect "historical price performance improvements and 'catch up' on the product cycle timing curve. Thus we believe IBM had been a bit tardy in making its 'normal' adjustment in the 1974- to mid-1976 period," Rothschild stated.

Much of the incremental demand for DP power will stem from the trend toward decentralization, Rothschild indicated. The interaction of remote units with a central mainframe should also fuel demand for larger central memories, as will the increased use of systems by non-DP persons, the report said.

Focusing on IBM's entry into the minicomputer marketplace, Rothschild said it should be possible for other well-managed mini makers to grow at about 25% over the next several years, even if IBM's market share rises substantially.

SBS Clears Regulatory Hurdles, Now Faces Legal Ones: Edelson

By Toni Wiseman
Of the CW Staff

NEW YORK — Satellite Business Systems [SBS] has hurdled a series of regulatory obstacles in its quest to achieve operating status as a domestic common carrier," but two legal hurdles remain ahead on the obstacle course, according to Harry Edelson.

Edelson, senior analyst at Drexel Burnham Lambert, Inc., noted SBS still faces a possible U.S. Court of Appeals review of the Federal Communications Commission's (FCC) approval — a review petitioned for by several interested parties including the Justice Department — and a Justice Department antitrust investigation.

"Those two legal actions are closely related, and it is increasingly apparent the Justice Department is the last major roadblock for SBS," Edelson stated.

Justice vs. SBS

Edelson said it is ironic the Justice Department initiated an antitrust investigation of SBS on the heels of a similar action against AT&T in 1976 — two bodies which are basically competitors.

He further suggested Justice is less worried about the entry of IBM into the domestic satellite arena than it is about the joint-venture aspects of SBS. Edelson cited a filing in which Justice said:

"The entry of IBM into the domestic communications field could inject an aggressive, well-financed new entrant into a market too long dominated by a monopoly supplier . . . Even if a new entry in satellite communications were to be procompetitive, the [FCC] must determine whether this gain is outweighed by the loss of significant potential competition a . . . joint venture [between Communications Satellite Corp. (Comsat) and IBM] may entail."

The filing went on to say that IBM would probably enter the market in any case, resulting in competitive benefits and lacking the anticompetitive effects "implicit in the proposed joint venture," and Comsat would remain a potential entrant.

Since the Justice Department failed in its bid to have the FCC establish a complete factual record, it will establish the record itself, Edelson stated. To this point, he noted, civil investigative demands (CID) have been served on SBS, IBM, Comsat and Aetna to determine whether the SBS joint venture violates Section 1 of the Sherman Act or Section 7 of the Clayton Act [CW, June 6].

The CIDs, Edelson observed, are related to matters such as correspondence between AT&T and IBM on satellites, the choice of partners and organizational structure of SBS and CML Satellite and studies showing the expected effect of domestic satellite services on IBM.

Catch-22 Situation

Looking at the IBM/Comsat joint venture, Edelson recalled the FCC gave IBM three options:

- Add a third partner, with no one partner controlling more than 49%.
- Enter the domestic satellite business with a 100%-owned subsidiary.
- Buy circuits from Comsat or others.

"In what was probably a Catch-22 situation, as far as Justice Department intervention was concerned, IBM chose the joint-effort option over sole-ownership option. It is likely IBM reasoned the joint-effort option would create less industry opposition and, therefore, have a greater chance of gaining regulatory approval," Edelson stated.

"If the Justice Department eventually files an antitrust suit against SBS because it believes Comsat and IBM should be free to enter the domestic satellite business inde-

(Continued on Page 34)

Adapso's Dreyer Says

International DP Body Needed

By Toni Wiseman
Of the CW Staff

DALLAS — A call for a lobbying effort on the part of European users and for the formation of an international policymaking body composed of data processing organizations was issued here recently.

The problem of telecommunications networks and of the privacy and security of the information passing through them and across national boundaries affect everyone, Jerry Dreyer, executive vice-president of the Association of Data Processing Service Organizations (Adapso), told attendees of the On-Line International Conference.

"While we continue to improve technologies enabling data to be sent around the world, we enact laws which restrict the kind of data we can send, often destroying the very services we set out to perform," he said, referring to some privacy laws which would make computerized airline reservations an illegal infringement of privacy because names and flights would be linked in the data base.

"Obviously, we have not yet found the appropriate trade-offs — the balance between what society demands in the way of service and what it demands in the way of privacy," Dreyer said.

Success calls for sophisticated data communications networks, he observed, and these networks must operate under uniform world communications standards.

"Just as we in the U.S. are at long last accepting the metric system as the standard measurement, similarly we all must move toward an international standard in the important field of communications and, I argue, it must be a high standard, one that data processing organizations can use," he stated.

Cooperation Urged

Dreyer pointed out that if U.S. and European DP organizations do not act in a unified manner on these matters, "we will find that the initiative has been seized by other groups and that the results will be difficult

(Continued on Page 34)

'Applications Houses' Booming as OEM Clients for CDC

By Molly Upton
Of the CW Staff

DALLAS — The "applications houses" market for OEM products has been growing at a tremendous rate for Control Data Corp.'s Peripheral Products Co., according to Dale Showers, vice-president of OEM marketing.

Although known principally for its disk products, CDC's OEM line also includes terminals, printers, an optical character recognition reader and media; it will soon include tape drives, he indicated in an interview here recently.

CDC's OEM business started picking up after the recession when it changed its marketing thrust from large companies to include smaller customers, he said.

In 1975, about 10% of its customers accounted for about 90% of its business. But CDC saw the minicomputer boom coming and substantial mainframers exiting business and put a major emphasis on sales in the mini area, he said.

CDC classsifies its OEM customers into four types: large; mini manufacturers; applications houses; and the large account that might consider an end user.

Rather than refer to CDC's fastest growing class of OEM customers as systems houses, Showers calls them applications houses because what they really are selling is specialty in specific applications, he explained.

Services Offered

In addition to its range of products, CDC offers other services to these firms, many of which are young. Its service affiliate, Syntonic, offers service for other firms' products on a contractual basis in 12 cities and plans to expand to at least 18 locations, Showers said.

In addition, CDC is starting to offer financing to firms through its Commercial Credit Co. (CCC) operation. Showers observes it is often difficult for firms to obtain financing from banks for inventory, and CCC could fill that need.

In selling to large end-user customers on an OEM basis, the company has strict criteria firms must meet in order to qualify for OEM purchases, Showers said. They must be in the business to resell products; be repetitive in volume; and add value to the product.

In order to increase the distinction between the OEM group and the rest of the company, there are very few products marketed by both. One exception is the 400M-byte disk drive, he admitted.

The disk business comprises the major part of CDC's OEM volume, he indicated.

More Than Disks

"One of the problems is that people don't know we're in other OEM areas," Showers continued. "We're more of a force in terminals than people realize."

CDC's share of the OEM printer market, took a dip, but Showers expects it to increase again with the addition last year of a band printer, which he said is superior to other 300 line/min printers.

In terminals as well as printers, the current emphasis in the marketplace seems to be on flashy items such as low cost or speed, he said.

But in the long run, quality is going to be a very important factor; the market is coming to recognize the need for quality, for fully formed numbers in printed characters and for terminals designed with human engineering factors, he said.

There are several reasons for CDC's success in the OEM arena, he indicated. The first is the reputation for quality. People also know CDC will be around in the next five or so years, and salesmen have a full line of products, he continued.

In addition, the firm offers worldwide capability, which is very important in the OEM field, he added.

Dreyer Calls for Worldwide DP Policy Body

(Continued from Page 33)

for us to live with.

"In fact, without the kind of unified action I suggest, doing business will be more costly, less efficient and, in some cases, impossible," he stated.

Dreyer urged Europeans to implement a lobbying effort in their own countries, similar to what Adapso attempts in the U.S., to make their needs forcefully known and taken into account by their governments.

Adapso itself must intensify its own efforts, particularly in the area of privacy and security regulation, he admitted.

He further urged the formation of an international policymaking body composed of DP organizations for the purpose of creating industry stands on critical issues.

"These stands will be communicated to already established international forums created to deal with data-processing related matters, such as the Consultative Committee on International Telephone and Telegraph [CCITT], which develops international telecommunications recommendations, and the OECD, where a Draft Treaty on Privacy and Security will be written," he said.

The issues on electronic funds transfer, privacy and security, tele- and data communications and postal regulations all involve the DP industry as it relates to Federal agencies in Washington and to innumerable state and local agencies, he noted.

Those dealing with myriad governmental bodies should help the U.S. DP industry meet the challenges of international relationships, he said.

Developmental Differences

Dreyer emphasized, however, the difference between the development of communications sevices here and abroad, where the communications function is a government-run monopoly or quasimonopoly.

The U.S. DP industry works under a system of checks and balances, among them user input, which help telecommunications develop according to user needs, he said. In addition, the industry always has recourse in the Federal Communications Commission and can switch to competing carriers to fight.

"In Europe, however, the telecommunications industry operates quite differently. Due to its governmental status — and to the comparative silence of European user groups — European communication services have developed in a void.

"The results...are not in the best interests of the data processing industry. Yet such services, such as Transpac, can be imposed on a nation regardless of how badly they serve our industry or any other.

"After they are imposed, it is too late to voice our dismay," Dreyer observed.

He reemphasized the need for user input, particularly in the case of bodies such as CCITT, to counteract the influence of common carriers, which is extremely strong. This is particularly true in the case of the CCITT, where the only voting members are governments that, in many countries, control telecommunications.

Of all the countries represented on CCITT, only the U.S. delegation has users among its members.

"If we had an International Data Processing Industry Council as the focal point of our industry to establish international policy on forthcoming proposals, we could persuade our governments before they go to the CCITT or other groups which impact our business," he said.

SBS Faces Legal Hurdles: Edelson

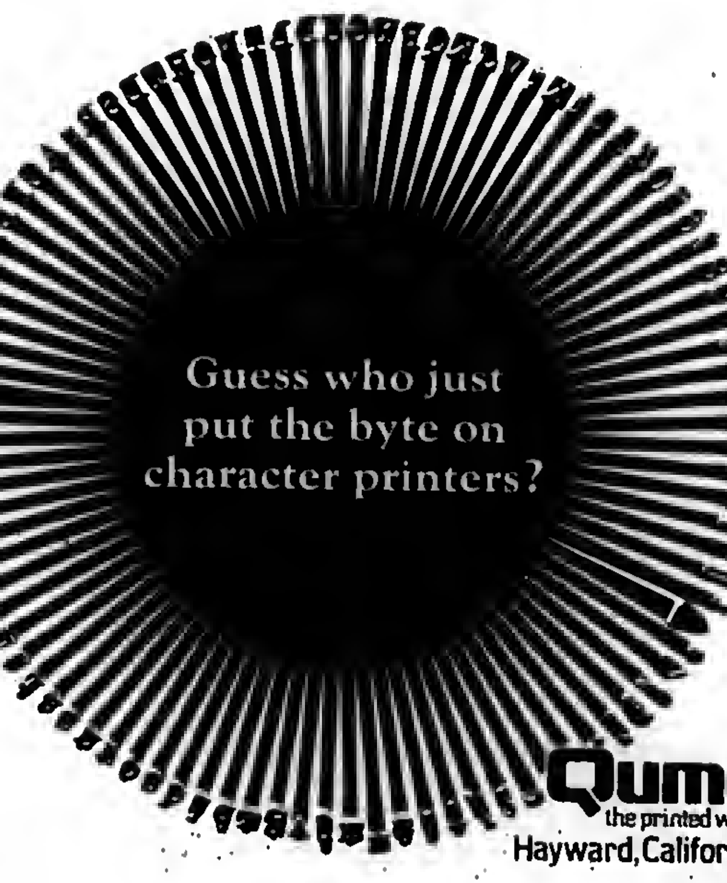
(Continued from Page 33)

pendently, it is quite conceivable IBM will get what it really may have wanted in the first place — a 100%-owned domestic satellite subsidiary," he speculated.

Edelson commented that Justice's rational for investigating SBS is "weak," since Comsat's entry would do little to ameliorate the competitive situation.

Total revenues for domestic satellite companies were only about $50 million last year, compared with total telecommunications common carrier revenues of about $35 billion, he noted. "The real competition for AT&T is IBM," he stated.

Edelson concluded by suggesting that ironically, IBM may benefit from the Justice investigation since the two most probable outcomes are that SBS will be approved or that IBM will have to enter the satellite business on its own, perhaps with additional restrictions.



Contracts

Computer Sciences Corp. has received a $40 million contract from the National Aeronautics and Space Administration for communications and instrumentation support services at Kenedy Space Center, Fla.

Grumman Data Systems Corp. has been awarded a $32.5 million contract to upgrade the U.S. Navy's Pacific Missile Test Center's computer facility at Point Mugu, Calif.

The Marine Systems Division of Rockwell International's Autonetics Group has been awarded a contract by the Naval Sea Systems Command for development of improved sonar processing equipment for the Navy's Poseidon submarine fleet.

Recognition Equipment, Inc. has received a $6.7 million contract for optical character recognition wand readers from NCR Corp.

Brandon Applied Systems, Inc. has received contracts totaling $3.1 million from United Airlines, Inc., FMC Corp. of Philadelphia and The Kendall Co. of Boston.

Harris Corp.'s Data Communications Division has received a $4 million contract from the U.S. General Services Administration for the lease or purchase of remote batch terminal systems by various federal agencies.

Computer Sciences Corp. has recieved a $3.2 million contract from the Federal Aviation Administration for an automated system to help the agency reduce aircraft delays and conserve fuel.

Kennedy Co. has received an OEM contract from Contraves AG of Zurich, Switzerland, for Kennedy's Model 9000 tape transports to be used in Contraves' numerically controlled machine tools.

Electronic Memories and Magnetics Corp. Severe Environment Products Division has been awarded a contract by Lear Siegler, Inc. to furnish memories for use in Lear's ARN 101 navigational computer systems in F4 aircraft.

Hendrix Electronics, Inc. has been awarded a contract by the *Chicago Tribune* to design and install a comprehensive electronic prepublishing system.

Lockheed Electronics Co., Inc. has received a contract from the U.S. Postal Service to install its Energy Management System in the Bulk Mail Facility in Jersey City, N.J.

The Pertec Division of Pertec Computer Corp. has been awarded a contract by Norsk Data A/S of Oslo, Norway, to provide digital magnetic tape transports and tape formatters.

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Kits Available on Credit

Heath Sees Future Revenues From DP

By Esther Surden
Of the CW Staff

BENTON HARBOR, Mich. — Heath Co., maker of those do-it-yourself kits for hobbyists, stuck more than just a toe into the personal computer marketplace with its introduction of two computer kit products complete with peripherals (see Page L).

The firm, whch boasted $90 million in sales for 1976 and expects that "in the near future over 20% of company revenues will be derived from computers," has joined forces with Digital Equipment Corp. for one of its products, a personal computer based on the LSI-11, and has designed a less expensive system around Intel Corp.'s 8080A, according to Bill Johnson, vice-president of marketing.

Heath made a stab at the computer hobbyist market before, Johnson recalled. In 1957, it introduced an analog system that cost almost $1,000, but it quickly found out "there was not such a ready market" for the product and adopted a wait-and-see attitude, he said.

Now, the advent of LSI technology combined with lower costs have made home computing possible, he said.

Systems Approach

"We decided to take a systems approach" and design the products with peripherals so the buyer would not have to go from store to store to find what was needed to complete the system, Johnson said. "Tbis was costly to us because we passed up some substantial sales ~~dollars"~~ while in the development stage.

Hopefully, however, the approach will be profitable in the long run because Heath had a chance to "observe the competition" and "time to do research," he added.

The two systems were designed for a beginner hobbyist and a sophisticated user and had to be able to satisfy the needs of both the hardware-oriented person who likes to know how to put things together and the software and programming types who like a system for what they can do with it, he noted.

They will be available on a revolving charge credit plan Heath offers to its customers. This is believed to be the first time an individual can obtain a computer on such a plan and Heath thinks that the availability of credit will increase the number of people who can comfortably afford the systems.

In-House Software

The firm has developed an in-house software capability, according to Lou Frenzel, product manager. The smaller of the two products, which is basically a Heath-designed system, was built with the cooperation of the hardware and software people and thus incorporates user features not often found in standard barebones types of systems, he said.

The result of the software effort was dubbed "Benton Harbor Basic" after the firm's headquarters.

A large part of selling to the hobby marketplace is producing easy-to-follow, readable manuals and teaching people how to use the product once it's put together, Frenzel stated.

Heath is now in the process of producing teach-yourself-software manuals for this purpose, an area in which the firm feels it excels. The construction manuals are already completed and ready for distribution, having been tested by nontechnical types and revised.

The company chose its suppliers of CPUs based on what it felt were user needs, he continued. It felt sophisticated hobbyists needed a high-performance 16-bit CPU and evaluated several before choosing the DEC LSI-11.

The contract with DEC includes a licensing arrangement providing use of Assembly and higher level programming languages such as PAL-11, ED-11, Focal and Basic. Heath users will be eligible for membership in Decus, the DEC users group, a company spokesman said, giving them access to applications developed by other users for the LSI-11.

Heath thinks the partnership with DEC will be fruitful since DEC doesn't "typically address itself to individuals," while the kit maker does, Frenzel continued.

The Intel unit was chosen because it was low-cost, had a "proven design, works well and has a tremendous software base," he added.

Heath has added an intelligent front panel, heavy-duty power supply, CRT and paper-tape reader kit of its own design to the value of that CPU to come up with a full system, he said.

Wescon '77 Set as Biggest Yet

SAN FRANCISCO — Four hundred exhibitors in 680 booths will be on hand here Sept. 19-21 to make this year's Western Electronic Show and Convention (Wescon) the largest in its 26-year history.

In addition to the exhibits, 32 professional program sessions have been scheduled as well as two special sessions entitled "Engineering Careers and the Problems after 40" and "Your Job Interview: The Million-Dollar Decision."

Session topics will range from new advances in peripheral circuits — with papers on the role of peripherals in microcomputer systems and media encryption using bit-slice devices — to satellite systems in the 1980s, with papers addressing the Intelsat V system design, the Tracking and Data Relay Satellite System and Seasat-A, a user-oriented ocean monitoring satellite system.

Other sessions will cover advances in bipolar LSI logic, analog interfaces in microprocessor systems, single-chip microcomputers and new-generation semiconductor memory devices.

The transition to distributed processing, switching power supplies and applications of time-domain measurement systems will also be addressed.

Show hours are 9:30 a.m. to 6 p.m. Monday and Wednesday and 9:30 a.m. to 9 p.m. on Tuesday at Brooks Hall and the adjacent San Francisco Civic Auditorium.

All sessions wil be held in the continental Ballroom Complex at the San Francisco Hilton Hotel. A free shuttle bus will operate between the hotel and the exhibits.

Further Information on Wescon is available from Ted Shields Public Relations, 493 S.Robertson Blvd., Beverly Hills, Calif. 90211.

HIS Says Orders for Level 6 on Target

By Molly Upton
Of the CW Staff

DALLAS — Orders for Honeywell Information Systems, Inc.'s Level 6 line of minicomputers are as planned and are growing nicely with the firm's ability to produce them, according to Jim Pompa, vice-president and general manager of HIS' Small and Medium Information Systems Division.

U.S. shipments of Level 6s are about evenly split between OEMs and end users, Pompa said.

Since the beginning of the year, HIS has signed a major new customer a week, he indicated, adding these are customers who have a potential for 100 systems.

The Level 6 is one of HIS' cornerstones in its thrust toward distributed processing. One of the key markets for the mini is the current HIS end user. A large Level 66 user might buy 30 to 50 minis for distributed processing, remote job entry and data collection, Pompa said.

"Everyone's out competing, but it's logical for our own users to buy the Level 6 because of the research and development and compatible software," he added.

"As more distributed processing appears, there will be more software on the 6 that is also compatible with the other HIS systems. This presents a better value to users of large systems" than other makers' minis, he continued.

The Level 6 features a high level of configurability because each logical function is on a separate board, Pompa observed, noting users can buy what they need.

HIS is also focusing on its terminal line as it relates to distributed processing. "Minis and terminals go hand-in-hand in distributed processing," Pompa said.

HIS is making all major investment in terminals and will offer a totally compatible line of terminals with software as appropriate to function within HIS' distributed processing," he said.

Executive Corner

- Carl A. Froebel has been promoted to vice-president of portfolio and personal trust services and Robert A. Stafford to vice-president of banking and thrift services for the Financial Data Services Division of Automatic Data Processing, Inc.
- LeRoy C. Ostrander has been elected vice-president for marketing and sales at Epicom, Inc.
- Gary M. Roth has been named vice-president of sales for Anacomp, Inc.'s Kalvar marketing division.
- Stanley A. Brooks has been appointed vice-president of marketing for Information Retrieval Systems Corp.
- Richard A. Strain has been named vice-president and center manager of National Sharedata Corp.
- Josepb G. Scartaccini has been elected vice-president of marketing for Tel-Tex, Inc.
- Michael Novak has been promoted to executive vice-president of Ross Systems, Inc.
- William W. Neal, Howard B. Eskin and Thomas McInerney have been appointed corporate vice-presidents of Automatic Data Processing, Inc.

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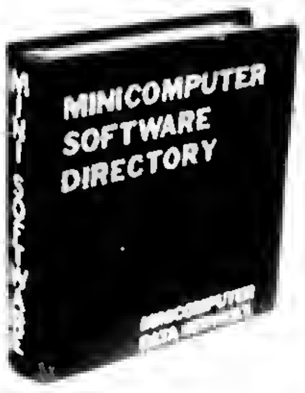

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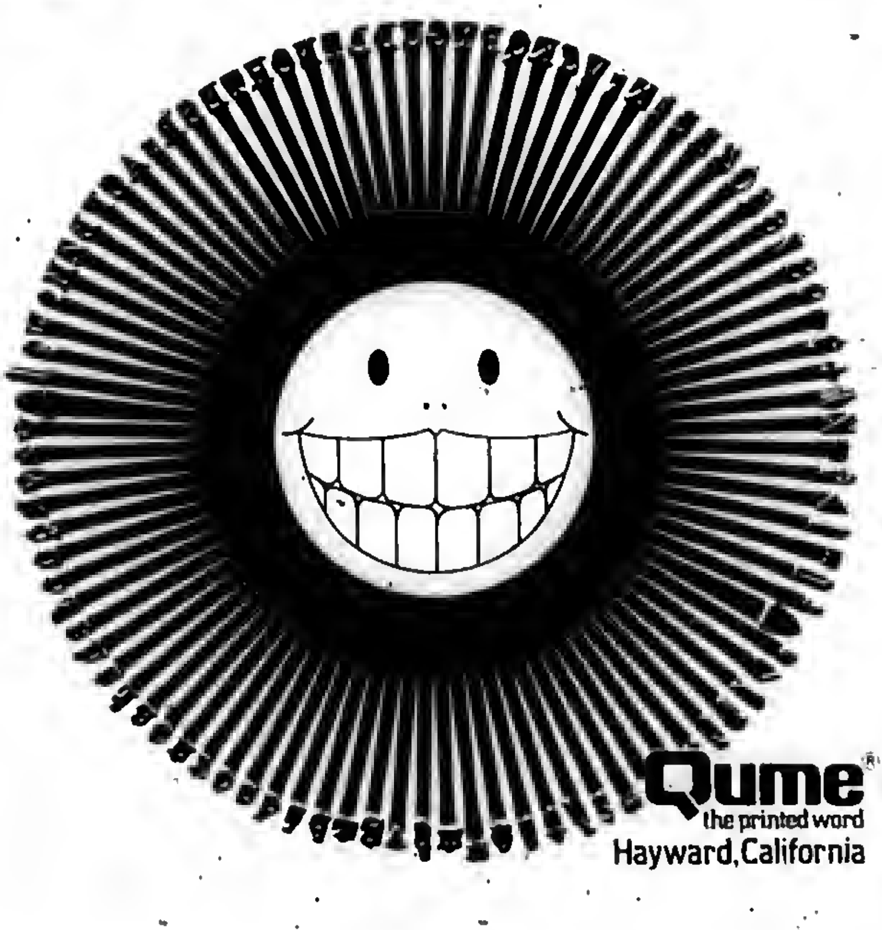

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Role of the Distributor — Part 2

Support Programs Called Vital to Organization's Success

By Bruce Milne
Special to Computerworld

Today, a minicomputer manufacturer must supply more than hardware, operating systems and discounts in order to ensure a successful distributor organization.

Only a few years ago, selling small business systems via distributors or OEMs was unique. Today there are over 40 companies marketing in this manner and a potential of over 75 more domestic and international entrants who have the technology to be systems suppliers.

Therefore, no matter what the business philosophy of a mini manufacturer regarding distributor support programs, today's competitive environment dictates a comprehensive set of support programs to attract and keep the quality distributor.

The dilemma for the manufacturer is that the primary purpose of distributors is to gain market coverage without heavy investment in a direct sales organization and extensive software development, yet such support programs cost money.

Because of this, the critical task for management is to prioritize these programs to best utilize their limited financial resources.

In order to do this effectively, they have to better understand the needs of their distributors.

In the early '70s, a small wholesale business wanting to solve some of its billing, accounting and information problems might have received proposals ranging from an NCR 400 and Buroughs "L" series to a Basic/Four system or low-end IBM System 3.

There was a dramatic difference in both the approach to the problem and in the technology of the hardware. Selling the differences and benefits of one system over another was an easier task than it is today.

In today's marketing environment, a mini system distributor may have few hardware differences over other minis and systems from the major manufacturers such as IBM and Burroughs.

These "majors," with their huge customer bases and large, experienced sales forces, still constitute the most important competition for distributors. Mini distributors and direct sales people for other mini manufacturers are a distant second and third in importance.

Given this basic understanding of the competitive environment, it is not surprising to find that most distributors feel they lose sales because of lack of "image" and customer concern about their longevity.

Because of the increasing importance of software in the systems sales and the lack of hardware differentiation, most distributors believe they must develop more superior applications software and provide financing service to offset the lack of price differences in the market place.

Areas of Focus

Because of these perceived needs, most distributors would like to see the manufacturers focus on a few key areas:

- Improved communication.
- Cooperative advertising.
- Marketing aids.
- Distributor financing.
- Application software support.

All of these relate to improving the distributor's image and presence in the market place. Communications cover a broad range of distributor transactions including getting concise delivery information, prices, new product information and technical help.

This is the last of a two-part series dealing with some of the findings of a recent industrywide survey on the role of small business computer distributors.

The research was conducted by Bruce Milne and Barry Klett at the Harvard Business School and was supported by Basic Four, Cincinnati-Milacron, Digital Equipment Corp., Lockheed, Olivetti, Qantel and Sycor.

The study included survey responses from 243 distributors and OEMs, interviews with executives of 12 manufacturers that are active in selling via distributors and related research. Because of the similarity in legal relationship, function and problems, distributors, dealers and OEMs were considered together.

Part I examined the significance of recruiting distributors as emphasized by manufacturers.

In the sales cycle, not being able to get that information on a timely basis can severely hurt the distributor's chances for an order.

Much of the communication problems can be helped by a more focused approach to the management of the distributor. For example, credit, marketing software and service questions may have to be answered by several divisions at the home office or field office, frustrating the distributor. A regional management system that can be the focal point for nearly all of the problems is a much better system.

In advertising, the distributors believe that the "primary" demand for small business computers is being created by the entry and massive advertising campaigns of the major DP manufacturers. They feel the mini makers can better serve the distributors by spending money to help them improve their image with some national advertising and more mailer campaigns, local radio, TV, newspaper and industry specific campaigns.

Marketing aids refer to demonstration programs, video-tape materials, brochures, shows and the like. Again, the distributor needs to project a professional image with his approach and the media he uses.

The financing need can best be met in the form of delayed billing. This is one of the major problem areas for distributors because they are generally undercapitalized.

A good month with two or three systems sales can literally put a distributor out of business if he is not receiving full customer payment for 90- to 120 days, yet is required to pay his supplier in 30 days.

This means a distributor may have to come up with an extra $100,000 or more in short-term funds as well as meet the increased personnel need resulting from the installation demands.

Support Programs Critical

Manufacturer software support programs are critical to the profitability of the distributor. Considering that the average distributor spends 40% to 50% of his total investment in software development and his net profits are only 6% to 10%, a reduction in the amount spent by him in software developmentwould mean less expense per system sale, more dollars freed for working capital and greater profit and sales.

A comparison of distributor organizations shows the percentage of distributor investment dedicated to software development is nearly half for groups with manufacturer software support vs. unsupported groups. Better results are also shown in sales and profits for the well-supported distributors.

This indicates that the manufacturer should supply some basic modules such as accounts received, accounts payable, payroll and invoicing to eliminate the redundancy in field development work among the distributors for these bread-and-butter applications.

The Questioning Distributor

A prospective distributor, or one considering changing its equipment sourcing, should naturally consider the reputation, product offering, hardware/software training and equipment service of any manufacturer. However, it should also look closely at the dedication and types of support programs the manufacturer has to insure the distributor's sales success and profitability.

Seven groups of questions a distributor might ask are:

(1) Are the communications links with the manufacturer clear and sufficient? Can I get the information I need on a timely basis?

(2) Are there basic software modules available and an applications interchange system? Are new systems released with basic application and demonstration modules so I don't have to develop from scratch programs and routines to use any new language or operating system?

(3) Is there a national advertising program and budget dedicated to helping me on the local cooperative advertising level?

(4) What types of financing programs are available? Leasing? Delayed billing? What happens if I cannot meet the short-term financial needs? Will the manufacturer help? If the manufacturer is very small, does he have the funds to provide financing programs?

(5) Is there a professional, competitive set of marketing aids available to me including demonstration materials, brochures, customer training aids, etc.?

(6) Are there training programs for management and sales personnel? Are regular seminars held and is there a distributor association supported by the manufacturer?

(7) Does the manufacturer promote industry penetration or is he trying to "shotgun" the general market? Is he stressing product superiority which could be short lived?

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Univac Starts Market Program

BLUE BELL, Pa. — Univac is actively pursuing the manufacturing industries' DP market by instituting a nationwide marketing program supported by expenditures of more than $20 million this year.

"More than 27% of the computers now installed in the U.S. are operating in manufacturing environments," according to C.R. Williams, vice-president and general manager of the Sperry Univac Americas Domestic operations.

"This large base is currently valued at more than $10.5 billion and is expected to grow to $16.5 billion by 1981," Williams said.

"Our new marketing program has been organized to capture a substantial share of the $9 billion in new and replacement computers, which will be delivered to the manufacturing industries in the next five years," he said.

To date, Univac has received orders from more than 140 manufacturing companies for the Univac Industrial System (Unis) a flexible material requirements planning and production scheduling system.

DP Firms Found Among Leaders in R&D Spending

By Toni Wiseman
Of the CW Staff

NEW YORK — Data General Corp., which spent 10.7% of its 1976 revenue on corporate research and development, took second place out of 600 firms in the category of percentage of revenue spent on R&D, according to results of a *Business Week* survey.

Hewlett-Packard Co. placed fifth, spending 9.7% of sales, and American Microsystems sixth, spending 9.6%, according to *Business Week* figures.

The survey, compiled with data from the Securities & Exchange Commission (SEC), showed that the 600 firms surveyed increased their R&D expenditures by 11.6% in 1976, compared with a 6.5% increase in 1975, the magazine reported.

Under new SEC rules, companies must report as R&D expenses all costs associated with the search for, and discovery of, new knowledge that may be useful in developing new products, services, processes or techniques, or that might significantly improve existing products, *Business Week* noted.

On the other hand, costs associated with routine product improvement, market research, test marketing, quality control and engineering follow-through in production cannot be expensed as R&D under SEC rules.

In an across-the-board comparison of industries, the office equipment segment, which includes computers, was the top spender in 1976, with aggregate expenditures of 5.4% of sales.

In spending per employee, office equipment was second, with an average of $2,347 per employee, *Business Week* said. Only the drug industry spent more.

For computer firms, IBM's R&D budget was far and away the largest, at $1.01 billion, but California Computer Products, Co. spent the most per employee — $3,592.

DG's expenditures were the largest percentage of sales, Mohawk Data Sciences' were the larges percentage of profits (210.6%) and Electronic Memories and Magnetics (EMM) had the largest percentage change from 1975 (102.3%).

Burroughs Corp., with 1976 sales of $1.9 billion, spent $107.9 million, or 5.8% of revenues, on R&D, a 6.9% increase over 1975, the survey showed. These expenses averaged out to $2,164 per employee and 58.1% of profits.

Calcomp, with $122 million in revenue, spent only $10.1 million, or 8.3% of sales, on R&D, a 7.1% decrease over the previous year. Nevertheless, R&D expenses for the firm averaged out to $3,592 per employee.

Control Data Corp. spent $58.9 million, or 4.4% of its $1.3 billion sales. This represents 124% of its profits or $1,416 per employee, *Business Week* said.

Further Findings

DG spent 10.5% of its sales and 90.8% of profits — a 47.9% increase over 1975, which averaged out to $2,978 per employee.

Digital Equipment Corp. spent 7.9% of sales and 79.5% of profits, a 20.3% increase. DEC's R&D spending averaged $2,336 per employee, according to *Business Week* figures.

With revenues of $2.5 billion, Honeywell expensed $125.6 million to R&D, which amounts to 5% of sales or 119.3% of profits, but only $1,774 per employee, the magazine said.

While IBM had by far the largest R&D budget, $1.02 billion, that figure represented only 6.2% of sales and 42.2% of profits and averaged $3,466 per employee, the survey found.

EMM spent 102.3% more in 1976 than in 1975. Its $4.7 million R&D expenses represented 5.2% of sales and 61.4% of profits or $1,144 per employee.

NCR Corp. expensed $94.3 million to R&D last year, a 10.9% hike over 1975. This represented 4.1% of sales, 104.7% of profits and $1,407 per employee, *Business Week* noted.

While Storage Technology Corp. reported $7.8 million in R&D expenses or $3,098 per employee, Telex spent only $2.1 million or $910 per employee. The companies' budgets were up 8.2% and 8.9% respectively over 1975.

Financial News

Nickels & Dimes

Comshare has arranged two financing arrangements. A term loan of $1.2 million has been arranged for the purchase of Xerox/-Honeywell Sigma 9 CPUs and Ampex memory, and a $2.2 million term loan has been arranged for refinancing to improve the terms of notes payable on existing equipment.

$$$

Hazeltine has entered into a new $6 million unsecured credit agreement with the Chase Manhattan Bank and the Long Island Trust Co. Hazeltine borrowed $3 million which, with additional company funds, was applied to the payment of $3.8 million to the Federal Deposit Insurance Corp. in full prepayment of a revolving loan and $1 million to Walter E. Heller & Co. in full prepayment of a term loan.

$$$

Data 100 plans a public offering of $10 million of convertible subordinated debentures due in 1992. The debenture will be convertible into common stock at any time prior to maturity with the interest rate and conversion price to be determined at the time the offering becomes publicly available.

$$$

On-Line Systems has declared its first cash dividend, of 5 cents payable July 15 to holders of record June 20.

$$$

Perkin-Elmer has declared a quarterly dividend of 8 cents payable July 1 to holders of record June 13.

$$$

Hewlett-Packard distributed about $16.2 million to more than 28,400 employees under its cash profit-sharing plan last month. This represented the first profit-sharing cash disbursement made by HP in 1977.

$$$

General Computer Systems and **North American Corp.** have acquired 45 data entry equipment leases for GCS 2100 equipment that had been foreclosed upon by the Bank of America

Making the most of terminal intelligence.

A special report on *Data Communications Terminals* in the July 25th *Computerworld.*

Intelligent terminals are changing the way we communicate with computers — making them easier to use, more accessible and responsive to users' needs. And *Computerworld's* next special report will focus on conversational and editing terminals, as well as remote batch terminals, CRTs and teleprinters.

Edited by Ron Frank, this report will examine ways to maximize the benefits of terminal networks while minimizing the costs. Using applications stories and tutorials, we'll cover a wide range of topics:

- Ways to determine how much intelligence (i.e. processing logic and memory) you need when changing from dedicated to multiapplication terminals.
- How some users achieved greater efficiency with their dedicated, "dumb" terminals.
- Ways to adapt your existing network to the emerging line protocols.
- Ways to configure terminal networks for multiple applications.
- Managing terminal networks for corporate efficiency — matching requirements with resources and equipment.
- A review of guidelines to use when evaluating terminals.
- The effect distributed data processing is having on terminal selection and use.

In all, this report could help you cut costs in your organization while establishing a firm base for future expansion. If you have anything to do with data communications efficiency, whether as a DP Manager, Communications Specialist, or Executive with an eye for efficiency measures, you shouldn't miss the special report in the July 25th *Computerworld.*

If you're in the business of manufacturing and marketing data communications terminals, you should put your ad here. You'll reach a rapidly expanding market. For example, International Data Corporation expects to see a tremendous increase over the next three years in the installed value of conversational and editing terminals used exclusively for data communications purposes: from $3.2 billion in 1977 to $5.8 billion in 1980. Your *Computerworld* salesman can give you complete details — but don't miss the July 8th ad closing date. Call Terry Williams at (617) 965-5800 to reserve space for your ad.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Based on 8080, LSI-11

Heath Introduces Kits for Personal DP

BENTON HARBOR, Mich. — The H8 and H11 are personal computers in kit form available from the Heath Co. Although primarily designed for home use, they will probably have some degree of use in very small businesses, the vendor said.

The systems are based on the 8-bit Intel Corp. 8080A micro and the Digital Equipment Corp. LSI-11 mini, according to the firm.

The 8-bit H8 features an intelligent front panel with octal data entry and display and a resident monitor wth built-in bootstrap for one-button program loading or storing, Heath said. The system can accommodate up to 65K of addressable memory.

Microcosm

The H8 is huilt around a 10-slot hus and features a built-in power supply. Available peripherals include a Heath CRT kit, paper-tape reader/punch, serial and parallel interfaces, a DEC hardcopy terminal and a cassette player/recorder, a spokesman noted.

The H11 features an LSI-11 with 4K of memory expandable to 20K, built-in backplane, power supply and I/O interface accessories. The H11 comes with a software package from DEC that includes an editor, PAL-11 assembler, linker, on-line debugging package, I/O executive, Basic and Focal.

The 12-in. CRT terminal available with the H11 has a 67-key Ascii keyboard with a 12-line, 80-character format. The unit can he formatted in four columns of 12 lines, 20 characters wide, and has a cursor control.

Users can format on the screen and when satisfied batch into their system, the spokesman said.

Standard Interfaces

Standard serial interfaces include EIA, 20mA loop and TTL I/O. The unit transmits at 110- to 9,600 bit/sec.

A Heath-designed paper tape reader/punch unit will function with any digital computer, the firm said. It uses standard 1-in. wideroll or fanfold 8-level paper tape.

The reader section reads tape at 50 char./sec while the punch operates at 10 char./sec. Punch and reader circuits are completely independent, the firm noted.

The systems and peripherals will he available through Heath retail stores and mail order catalogs, the firm said.

The H8 costs $375 for a "fully wired and tested CPU," assembly and operations documentation. All systems software is included in audio cassette form.

Memory and I/O interface accessories include an 8K board with 4K of static random access memory (RAM) for $140, a 4K expansion chip set at $95, a serial I/O interface board with 1,200 bit/sec audio cassette interface for $110 and a three-port parallel interface which costs $150.

The H11 CPU costs $1,295. A 4K by 16-bit RAM board costs $275, a flexible serial interface costs $95 and a parallel interface costs $95.

The CRT costs $530 in kit form while the paper tape reader/punch unit costs $350.

The firm is also distributing DEC's LA36 printing terminal in assembled form for an undetermined price.

Heath can he reached through Department 350-26, Benton Harbor, Mich. 49022.

Mits Has Interface For Audio Cassette

ALBUQUERQUE, N.M. — Mits, Inc. has introduced an audio cassette interface for its 680b microcomputer that enables storage and retrieval of data.

The 680b-KACR circuitry is based on the Kansas City Standard, the firm said, and costs $250 assembled.

The price includes 8K of Basic on cassette if the customer has the 680 mainframe and the 680 BSM 16K memory board, a spokeswoman said.

Otherwise, the interface costs $225 and the software costs $200 from the firm at 2450 Alamo S.E., Albuquerque, N.M. 87106.

NOVA MAINTENANCE

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Fortunately the NOVA Users in the Washington, D.C. metropolitan area have a second choice to the slow response to service offered by the manufacturer.

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CORRECTED ADVERTISEMENT
SPECIAL LETTING OF NOVEMBER 9, 1977

Prospective bidders are hereby advised that the following Advertisement has been corrected to state that *Prequalification of Sub-Contractors will be required for this project.* (See * Net Classification required for bidding the project).

Bids will be received at a Special Letting sheduled for November 9, 1977, at 10:30 a.m. EST in Parlors C&O, Civic Center, Lansing, Michigan, for the following project:

PROJECT	I U 82023	Job No. 04118 A	Fed No. I UF 76(1)
	I 82023	04121 A	I 94-5(109)216
	U 82111	09094 A	U 86-1(210)
	I 82195	04133 A	I 75-1(164)44
	M 82023	11644 A	

INSTALLATION OF A COMPUTER-BASED FREEWAY SURVEILLANCE AND CONTROL SYSTEM FOR 32.5 MILES OF FREEWAYS IN THE CITY OF DETROIT, WAYNE COUNTY, MICHIGAN. THE PROJECT INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, THE FOLLOWING ELEMENTS:

Provide and Install Data Acquisition and Control System, Including Display Panel, Operator's Station, and Associated Equipment.

Design, provide, and Install Control Room modifications to accommodate the Control Room equipment, including fire protection, power, climate control, raised floor, etc.

Design the entire field equipment layout, and install traffic detectors on 32.5 miles of Freeway and ramps, and communications equipment to the Control Center.

Install Ramp Metering equipment on six ramps, and communications equipment to the Control Center.

Install closed circuit television cameras and associated equipment at four locations, communications equipment to the control center, and receivers at the control center.

Provide a performance Assurance Service Program for the System for 10 months after acceptance.

Install a Motorist-Aid Call Box System on 13.9 miles of freeway.

This project is a Federal Aid Project under the provisions of the Federal Aid Highway Act of 1968. As defined under Section 113 of Title 23 U.S. Code as amended. The Davis-Bacon Act is applicable and requires the Secretary of Labor to determine the minimum wage rates to be paid by the contractor and subcontractors, which rates will be given in detail in the proposal.

ATTENTION IS CALLED TO SECTION VII OF THE REQUIRED PROVISIONS REGARDING SUBCONTRACTING.

This project is subject to the BID CONDITIONS-AFFIRMATIVE ACTION REQUIREMENTS-EQUAL EMPLOYMENT OPPORTUNITY-DETROIT PLAN. (See Proposal)

Net Classification required for this project is:
1084 N-9* (Computer Traffic Control)
Prequalification of Sub-Contractor will be required for this project.

Bid Deposit required is $50,000.00

Completion data is 660 Calendar Days.

Plans may be examined at the Michigan Department of State Highways and Transportation Freeway Operations Unit, 2211 E. Jefferson, Suite 100, Detroit, Michigan

* Prequalification Forms are being furnished for your use in becoming prequalified with the Michigan Department of State Highways and Transportion. If interested in bidding on this Computer-Based Freeway Surveillance and Control System project, you must file all the necessary documents required for prequalification on or before (preferably before) September 20, 1977. In addition, form 1300, Statement of Current Contracts and Subcontracts, as of September 30, 1977, must be submitted by October 12, 1977.

The Michigan Department of State Highways and Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

TI Adds Micro Developer

HOUSTON — Texas Instruments, Inc.'s Microprocessor Development System for its TMS 9900 series of microprocessors is based on the FS990 software development system.

The system includes the TMS 9900 emulator/advanced Microprocessor Programming Language (Ampl) package and the FS990 software development system. The disk-based FS990 includes a Model 990/4 microcomputer with 24K words of 16-bit memory, dual floppy disk drives and a Model 913 CRT.

Options include the Model 990 programmable read-only memory (Prom) programmer, Trace Data Module Kit, Model 810 printer and Fortran software license.

The system features 9900 microprocessor emulation, logic state trace, Prom/read-only memory (ROM) implementation, Fortran and Ampl, an interactive control language.

The unit provides software development in both Fortran and Assembly language: integrated software/hardware emulation for debug and test; and firmware implementation, the firm said.

The emulation feature provides support during the entire design phase, from design evaluation through emulation and testing and evaluation, TI said.

The system can also generate stand-alone Fortran routines which can be compiled to 990 computer object code for execution on a 9900 Target system, according to the firm.

The basic system price is $13,600 from TI's Digital Systems Division, M/S 784, P.O. Box 1444, Houston, Texas 77001.

Sentry Developed for LSI Testing

SAN JOSE, Calif. — Fairchild's Sentry V is a cost-effective version of the firm's Sentry VII testing system for LSI production testing, the firm indicated.

The multitasking Sentry V handles microprocessors, peripheral chips, bit slices, and digital hybrids, among other components.

The unit is source program-compatible with the Sentry II, VII, 600 and 610, Fairchild said, and is hardware-compatible with the Sentry VII.

The hardware is a 24-bit CPU with up to 196K words of semi memory.

Prices for a Sentry V system start at $169,500 for a complete 30-in. system from Fairchild's Instrumentation and Systems Group, 1725 Technology Drive, San Jose, Calif. 95110.

TEI Producing Unit As Micro Foundation

HOUSTON — TEI, Inc. is producing a foundation unit for a microcomputer system which includes cabinet, power supply and a 12-slot S-100 bus system with all edge connectors inserted, soldered and checked out.

The unit, dubbed The Mainframe, is compatihle with all S-100 bus-type PC hoards, according to the firm.

A fan is also included.

The unit costs $445 assembled and $395 in kit form from CMC Marketing Corp., 7231 Fondren Rd., Houston, Texas 77036.

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Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077

F&S Sees $3.5 Billion in Law Office Automation

NEW YORK — Law office automation is a virgin market with a sales potential exceeding $3.5 billion over the next 10 years, even assuming only 50% of the law offices will be substantially automated, according to a recent report by Frost & Sullivan, Inc. (F&S), a market research firm here.

This $3.5 billion in revenues represents about $1 billion for service hureau accounting services, $500 million for small business computer systems and $2 billion for text-editing word-processing systems, F&S said.

In addition, another $2 billion will come from computerized litigation and library research that pertains to the legal profession, the researchers noted.

"We expect that almost all law offices will have some form of test-editing equipment within the next 10 years, with the larger law firms employing shared-logic multiterminal systems and the small- to medium-size law firms having a mixture of the low-cost typewriter with internal memory and the higher cost video terminal minicomputer system," F&S stated.

The report projected text-editing word-processing will yield the highest sales, with annual sales of more than $200 million from 1978.

It added, however, that "the type of text-editing systems will drastically change from a typewriter to video terminal microcomputer system with diskette or disk storage and a line printer. Variations of the text-editing system will include single or multiple terminal systems."

In-House Systems

By the mid-1980s, about 40,000 law firms will be using DP services and equipment, with most firms opting for their own in-house small business systems, F&S predicted.

Smaller firms will turn to sevice bureaus while medium to large firms, with eight lawyers or more, will be more apt to acquire an in-house system.

Such systems will range from a $15,000 single terminal diskette system with time-accounting software to a $75,000 multiterminal disk cartridge system with accounting and docket control software, it indicated.

Limited Use?

"The mixture of data processing and word processing, while appearing economical, may see limited use due to the need to perform both activities during the day.

"The larger multiple terminal system could perform both functions, but the law firm will have a high initial purchase cost," the report said.

F&S further noted that computerized legal research, while not specifically a law automation product, will gain considerable popularity with the large number of law firms involved in litigation. It cautioned, however, that only a small number of firms will have sufficient resources to develop such research systems.

"Like other professional service industries, the law office has been bypassed as a market for data processing and sophisticated word-processing services. The competition has been mainly law-oriented service bureaus, independent software companies and some input from the larger data processing companies in a more general sense.

Open Market

"We feel that the market is still open and companies that can offer both service and equipment will be the most successful. That is, the company must possess capabilities to offer a solution to the entire office automation needs rather than just one segment.

"Since the law office requires a long, hard sell, only those that can offer both varied type products and have financial staying ability will last.

"A nationwide service bureau and small system distributor will have the best chance of success," F&S suggested.

COM Coming of Age

ROCHESTER, N.Y. — Even though computer output microfilm (COM) equipment has come of age, manufacturers must accept continuing challenges to their ability to provide product enhancements responsive to a changing marketplace, an industry executive said recently.

Computer output microfilmers have survived excessive speculation since their introduction in the late '60s that they would or would not achieve a major level of acceptance, according to Wilbur D. Robinson, Kodak business systems planning coordinator.

"Many feel — and actual COM placements since 1972 seem to support it — that COM's growing pains are subsiding; the product is coming of age," Robinson said.

He cited inflexibilities in hardware and marketing methods as major growth constraints that have been removed.

New Companies

Micro Peripherals, Inc. has been formed to manufacture and market peripheral products for the personal computing, small business systems and OEM markets.

Interactive Systems Corp. has been formed with Peter G. Weiner as president.

The firm is located at 1526 Cloverfield Blvd., Santa Monica, Calif.

NCE Computer Systems, Inc. has been recently formed. The company will handle international sales and service of minicomputers manufactured by International Computer Products, Inc., in Dallas.

Jim Capuzzo is president. The company is located at 1536 Brook Drive, Downers Grove, Ill. 60515.

Micropolis Corp. has been formed to specialize in the design and manufacture of data storage devices for home and industrial microcomputer markets.

Stuart Mabon is president. The company is located at 9017 Reseda Blvd., Northridge, Calif. 91324.

Comdisco, Inc. and **Forsythe/McArthur Associates, Inc.**, two third-party leasing companies, have entered into a partnership to form the Terminal Leasing Company.

The company is located at 919 North Michigan Ave., Chicago, Ill. 60611.

EMI Technology (Southeast Asia) Ltd. has been formed here to market a range of EMI's technological products, including the EMI-Scanner computerized medical X-ray system throughout Southeast Asia.

G.W. Philips has been appointed managing director of the company.

J.H. Morgan Co. has been formed to provide consulting services for problems having combined technical and management aspects in the areas of DP, communications and electronic systems.

James H. Morgan is president. The company is located at Post House Road, Morristown, N.J. 07960.

COMPUTERWORLD INDEX

SUBSCRIBE TO THE 1977 COMPUTERWORLD INDEX AND GET SIX MONTHS OF REFERENCE INFORMATION FREE.

The new Computerworld Index, published quarterly and cumulative, is an invaluable reference tool for organizations that have a need-to-know about what's going on in the computer world.

The first issue of the Index for example, covers the last six months of 1976, and it includes more than 4,000 entries by subject, author and name of any company mentioned. It breaks topics down into highly usable and convenient categories:

- There are entries by *product or service*, like *PRINTERS*, which has 37 entries in the six-month period covered; or *LEASING*, which has 10.
- There are entries by *industry*, like *INSURANCE*, under which there are 17 entries for various stories on the use of computers in the insurance industry.
- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory, security* and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- ... and there are *others: KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries ... and there's much, much more.

Company Names, for example, are a very important part of The Index. Looking under IBM, we find *ten* categories:

- IBM GENERAL
- IBM LITIGATION
- IBM SOFTWARE
- IBM SYSTEM 3
- IBM SYSTEM 7
- IBM HARDWARE
- IBM PRICING
- IBM POLICY
- IBM SERIES 1
- IBM SYSTEM 32

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COMPUTERWORLD
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Genova

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As a professional in Microprogramming, you're aware of this area's bright future. Now, here's your opportunity to take advantage of this vast growth potential by putting your expertise to work with an industry leader.

Digital's Software Services' new Microprogramming group is currently seeking Senior level professionals to assume major responsibility for providing microprogramming software support for PDP 11 systems throughout North America and Europe. This rewarding international involvement will include consulting directly with principal customers on systems analysis, microprogram design, and microprogramming debugging.

You must have experience with electronic or logic design. Experience in the design and implementation of real-time software systems using assembly language (RSX-11 or MACRO-11 preferred) plus good customer-oriented interpersonal skills are also required. A BSEE and/or microprogramming experience is desirable.

Located at our corporate headquarters in Massachusetts, this is a group with exceptional expansion potential. If you meet the above requirements and are ready for challenges and success Digital offers, please forward your resume to Dale W. Welch, Digital Equipment Corporation, Dept. K74, 162 Main St., Maynard, Mass. 01754.

We're the company looking for people.

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digital equipment corporation
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Amdahl interviewing in Poughkeepsie and Long Island.

Amdahl Corporation, manufacturer of the well-received 470V/6 computer system, has met the challenge of designing and building a new generation of large computers. Although the past year has seen us grow, there's still room on the ground floor for individuals who seek a challenging and friendly environment. Our benefits package is excellent and you'll be well-compensated for your efforts. Following are some of our more immediate needs. If you're a qualified candidate, perhaps the opportunity you desire is here . . . at Amdahl.

DIAGNOSTIC ENGINEERS

High level languages, logic design. Design and develop advanced diagnostics.

DESIGN AUTOMATION ENGINEERS

Language design, data base, design verification, test generation, physical packaging, routing.

DIAGNOSTICS QA ENGINEERS

Software QA, high level and assembly language, logic design and computer organization.

SOFTWARE ENGINEERS

Mini-computer real time O/S, multiprocessing and large systems. Or configuration management in code control or file control systems.

Amdahl engineers will interview in both Poughkeepsie and Long Island on Sunday, July 17 and Monday, July 18.

Qualified professionals are invited to schedule an interview. Send your resume to Chacko Neroth, Amdahl Corporation, 1250 East Arques Avenue, P.O. Box 5070, Sunnyvale, CA 94086, indicating 435-E on your response. We are, of course, an equal opportunity employer.

amdahl

MANAGER

Minicomputer Systems/Operations

Responsibilities include coordination and administration of the academic interactive computing facility. Duties include assisting faculty and students, training and supervising student operators, and managing system resources.

An advanced degree and professional work experience in an academic computing environment is preferred. Knowledge of FORTRAN and BASIC is essential. Some statistical background is desirable.

Salary competitive. Submit complete applications including resume and references to Miami University, 52 Hughes Labs, Oxford, Ohio 45056. Deadline August 15, 1977. EOE/AA

PROGRAMMER/ANALYST

2 positions

The State University of New York, College at Utica/Rome, seeks two programmer/analysts to design, program, and implement Admissions, Student Records, Personnel, Financial Aids, Budgeting, and Student Accounts Systems on RJE linked to IBM 370/158.

Qualifications: 2-3 years of administrative programming experience using ANS COBOL in large-scale IBM 370/158 OS/VS environment, preferably in a university. Must have OS/VS JCL experience. Assoc. degree in business or data processing. Experience in an RJE, distributive processing, and on-line environments plus a bachelor's degree most advantageous. Salary commensurate with experience and qualifications. Reply by July 22, 1977. Send letter of application, complete resume, and salary history to:

Personnel/Affirmative Action Office
State University College at Utica/Rome (Box 799t)
8tt Court St.
Utica, New York t3502
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Kaytronic Corp. is opening offices in New York, N.Y., Boston, Ma., and Dallas, Tx. Positions available include data processing sales, and service representative.

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Send resume and salary requirements to:

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We are EDP recruiting specialists concentrating on positions in the Pittsburgh and Tri-State area. The following is just a cross-section of the opportunities that are available.

Sys/Anal (3) Mfg & Financial	To 25K
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Cobol, IBM & Honeywell. Send resume including salary history in confidence to Barry Lopez, c/o:

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ACADEMIC POSITION ANNOUNCEMENT

Electrical Engineering
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Tulane University
School of Engineering
New Orleans, LA 70118

Assistant Professorship effective January 2, 1978. Applicants should have a doctoral degree and a strong interest in teaching undergraduate courses in programming languages, assembly language, systems programming, operating systems and other advanced software topics. Familiarity with PDP-11 desirable. Send resume and three references to:

Dr. Victor J. Law
Chairman, Computing Science Div.
Dept. of Electrical Engineering
School of Engineering
Tulane University
New Orleans, LA 70118

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PROGRAMMERS AND ANALYSTS

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Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

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Cherry Hill, New Jersey 08002
(609) 667-4488

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1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

ANALYST PROGRAMMERS

Applied Financial Technology, Inc. is seeking additional Analyst Programmers with assembler experience for the New Systems group. Knwledge of financial/accounting applications using data base techniques in 3700 OOS/VS environment a definite plus.

We are a subsidiary of Ouckeye Federal serving the financial community through tele-processing as well as batch processing.

Salary commensurate with experience. Excellent employee benefits and company paid. Please send resume with salary history to:

aftek
W. Moore
Personnel Department
36 East Gay St.
Columbus, Ohio 43125

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Link your career to the unprecedented growth of ADR's Software Products Division. Participate in defining, developing, and enhancing our software product line. We are interested in dedicated software professionals who are capable of doing advanced software development. If you have proven outstanding talents in the job areas shown below, we believe you will want to consider career opportunities at ADR.

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- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Stong IBM Assembler language background.
- On-line system development experience in either a DOS/VS POWER, OS/VS, or CICS environment.
- At least 2 years experience or a computer science degree.
- Familairity with COBOL desirable.

DATA BASE APPLICATIONS/PROGRAMMERS

- Experienced in the use or development of Data Base Management systems.
- Strong IBM Assembler background.
- Minimum 3 years experience.
- College graduate or equivalent.

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- Software documentation experience.
- Degree in English or Journalism.
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Some Facts About ADR . . . founded in 1959 . . . development personnel average well over 8 years with company . . . field and sales personnel average over 5 years . . . stable (Over $15 million last year) . . . traded on American Stock Exchange . . . employs over 300 people . . . small enough for personal recognition . . . informal and flexible environment . . . representatives throughout the world . . . software product line diverse, versatile, state-of-the-art . . . excellent employee benefits.

Please send resume
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complete confidence to:
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Software Products Division
or call (609) 921-8550

APPLIED DATA RESEARCH
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PROGRAMMERS/ANALYSTS

The Dayton area's largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

Two years NCR NEAT/3 or NCR COBOL experience desired. Experience with CIF, CIRF and/or commercial bank applications preferred.

We offer an excellent starting salary plus an outstanding fringe benefit program. Send resume to:

Personnel Division
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National Bank & Trust Co. Winters Bank Tower
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Director of Computing Services

Dartmouth College

Directs administrative, technical and development/research activities of Kiewit Computation Center to provide quality computing services to all segments of the Dartmouth College community. Responsibilities include educational and administrative computer services, staffing, training, program and policy development, liaison with committees and user groups, and contacts with other institutions and organizations. Prior experience with a time-sharing computing system is essential, as well as administrative experience in managing a major academic cost center. Preference will be given to candidates who demonstrate a proven ability to relate to diverse user groups including students, faculty and administrative staff. Extensive experience in research and administration of computer-related activities with recent experience at a senior administrative level.

Submit resume by September 15, 1977 to Chairman, Search Committee, Director of Computing Services, 201 Wentworth, Dartmouth College, Hanover, New Hampshire 03755.

DARTMOUTH COLLEGE
An Equal Opportunity/Affirmative Action Employer

SOFTWARE SALES MANAGER

DTSS. Incorporated seeks a person to take charge of sales of the Dartmouth Time-Sharing System software. This chief salesperson will also supervise technical sales support personnel, be responsible for costs and revenues, and help formulate sales and pricing policies. Frequent travel should be expected. Candidates should have sales experience and be familiar with computing.

DTSS software, a time-sharing operating system originally developed by Dartmouth College, has been enhanced and refined by DTSS Incorporated. Its particular strengths are in ease-of-use, the economies of large numbers of simultaneously supported users, multiple languages, commonality of foreground/background modes, and highly-developed interfaces to telecommunications networks and interactive terminals. DTSS software runs on Honeywell Level 66 computer equipment and therefore Honeywell supports efforts to sell DTSS software.

DTSS Incorporated is a five-year-old, profitable, New Hampshire corporation owned by Dartmouth College. Current annual sales of nearly one million dollars are due to ten software license agreements with a prestigious list of Fortune-500 companies in the automotive, aerospace, chemical, and computer services businesses.

This opportunity is at our offices in Hanover, New Hampshire. This college community in the forested upper valley of the Connecticut river has fine outdoor recreational opportunities, but is is only a few hours' drive from Boston, Montreal, and New York. Compensation includes a base salary plus a strong incentive bonus for successful sales performance. Please send resume to Dr. Robert F. Hargraves, Jr., President, DTSS Incorporated, Box 799, Hanover, NH 03755.

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SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
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PROGRAM MANAGER

Excellent oppty for seasoned shirtsleeve admin to head up research project. Must have previous supervisory exp + budgeting, scheduling, etc. Key is process control/scientific applications. Degree. $20,000 (Fee paid) Contact P. Siegal

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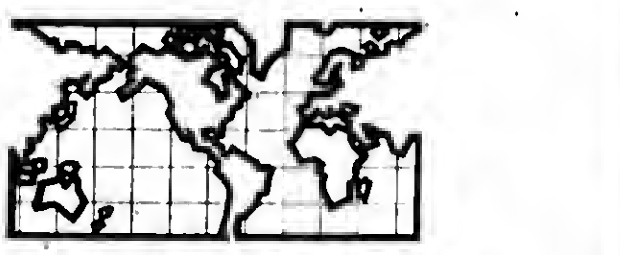
CICS Applications Manager



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Expand your horizons by joining multi-billion ITT and this rapidly, steadily growing international common carrier division.

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Familiarity is necessary with file structures and design, data base design and management, access methods and current hardware systems architecture.

The position affords favorable advancement prospects. Please send resume, including salary data, in confidence to E. Asmus.

ITT *World Communications*

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Well known, major corporation located in one of the most desirable work and recreation centers is searching for an ambitious growth minded Systems Analyst.

Experience must include strong interface skills and several years design in commercial, accounting or sales/marketing systems.

You will communicate with all levels of management and have visibility in an IBM, On Line, Data Base environment. Company offers all major benefits and paid relocation. Call, write or visit for information.

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PROGRAMMERS

Southern California Edison offers you a career in data processing

Our commitment to explore new applications in computer technology will keep you in the mainstream of your profession. You can become part of a Data Processing Department with 350 employees involved in a state-of-the-art environment based on the 370/168-MP and employing CICS, IMS, and other advanced software packages.

CICS Programmer

CICS Applications Programmer for development of 700 terminal customer information system. Heavy in assembler, COBOL, MVS, TSO, VSAM. 4-5 years experience preferred. (Dept. 80)

Systems Programmers

We have one position requiring 2-3 years experience as a Systems Programmer with specific experience in IMS or CICS. VTAM, TCAM and TSO experience helpful. (Dept. B1)

In addition, we have another opening requiring experience with Teleprocessing hardware with some experience in the following areas: VTAM, TCAM, NCP, EP externals and internals. TSO and CICS experience helpful. (Dept. B2)

Hardware/Software Analyst

Position requires demonstrated proficiency in hardware and software analysis, specifically competitive studies. A proven record of having cost effective recommendations implemented, is essential and experience in hardware planning is a definite asset. A minimum of 3 years related experience, preferably on IBM 370 systems is desired. (Dept. 83)

For consideration, please submit your resume and salary history to Professional Recruitment. (Please indicate Department Number.)

P.O. Box 800, Rosemead, CA 91770
We aggressively support equal
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SYSTEMS SPECIALIST

Major Dallas Energy Company

If you are a Computer Systems Professional and have at least 5 years experience in high-level systems analysis and major project leadership, we need your expertise. Your primary responsibility will be in business systems application software, but you will also serve as a liaison between the Systems Development Staff and functional management. We require a degree in computer science, business, engineering or related field and would prefer a masters in business or computer science, plus formal training in systems analysis techniques and project management methods. You must have working experience in oil and gas industry, fabrication manufacturing systems and/or accounting finance systems. Approximately 10% travel is involved. We offer an excellent salary and benefits package. Send resume outlining background, education and salary history, in confidence to:

Employment & Employee Relations
ENSERCH ENERGY
P.O. Box 2649, Dallas, TX 75201
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Sycor, Incorporated, a leader in the manufacture of distributed data processing systems, is currently seeking qualified individuals for systems programming positions.

SYSTEMS PROGRAMMERS

Minimum two years' experience as a Systems Programmer in any of the following areas:

- Data Communications
- Compilers and Languages
- Access Methods
- Data Base Management Systems

Experience in Mini/Micro computers with Assembler language is desired. BS in Computer Science or equivalent is a must. MS is preferred.

Please send resume with salary history to:
Gopi R. Jindal, Ph.D.
Manager, Professional Employment
Sycor, Inc., 100 Phoenix Drive
Ann Arbor, Michigan 48104
(313) 995-1156

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

Sycor, Inc.
An Intelligent Idea

A great measure of our success is the result of the professional EDP team we have. As we grow, we continue to need more such talented individuals to be properly trained. If you're looking for a working environment which is receptive to fresh thinking — and rewards it, you should be exploring what we have to offer. Right now, we're seeking a:

SENIOR TRAINING SPECIALIST

Systems and Data Processing

The outstanding individual we are looking for will have many important responsibilities which inlude the:

- **Assessment of training requirements and development of training programs.**
- **Administering and conducting training courses for Systems and Data Processing Personnel.**
- **Identifying and evaluating external training resources.**
- **Assiting in preparation of our Training Newsletter**
- **Preparing of plans and schedules for the implementation of technical training programs.**

To qualify, you should possess 2-3 years' experience in Education and Training in the EDP field. A College Degree is preferred. In addition, specialized knowledge of hardware and software applications is highly desirable. Good communication skills (both verbal and written) are essential.

We offer you an excellent salary and benefits package, outstanding growth potential, and a congenial, professional working environment.

To apply, send your confidential resume with salary history/requirement to: N.P. Fischler, Manager of Employment.

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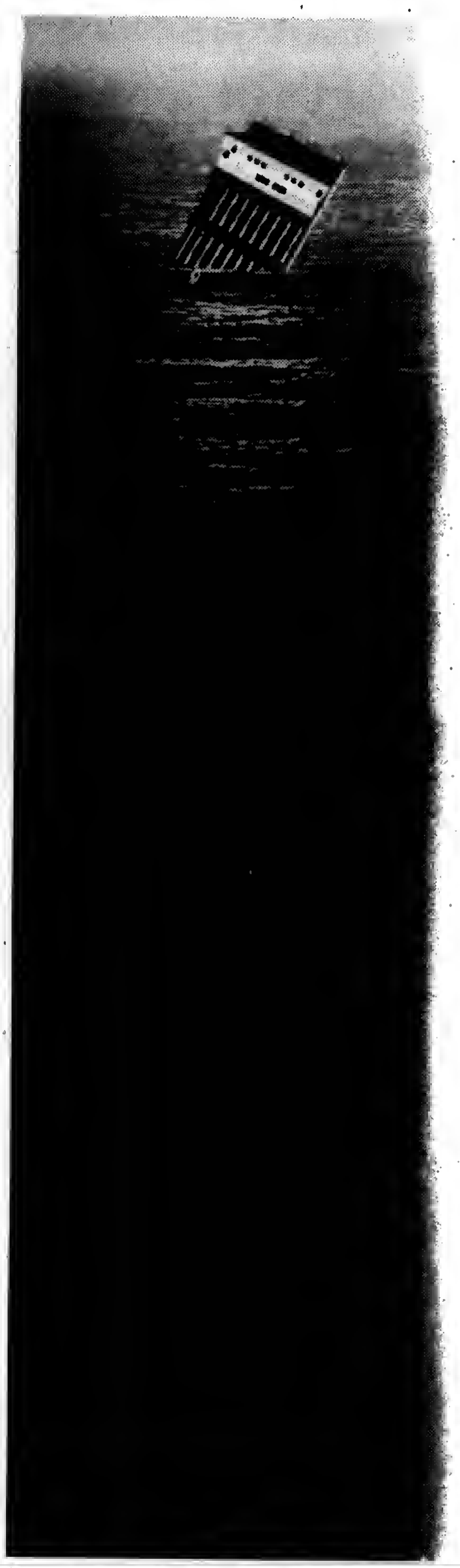

The Tip of an Iceberg

There's much more to GTE Automatic Electric Laboratories' involvement in the digital hardware and software evolution in Telecommunications.

The #3EAX computer-controlled switching system, a portion of which is portraying our iceberg tip, features a digital PCM network and stored program control. It is one of a family of advanced systems spearheading our digital evolution in telecommunications. Our primary assignment is to research and develop the communications systems of the future. Sophisticated systems employing state-of-the-art techniques in digital hardware, and the development of complex software architecture, support systems and programming

GTE Automatic Electric is a major member of the GTE Family whose research and development expenditures ranked among the top 50 Research and Development spenders in U.S. industry in 1976.

We are embarking on a major expansion of our technical and laboratory staffs.

We're talking with skilled professionals. . not only those with telecommunications experience, but individuals with experience in virtually every segment of the computer, and computer related hardware/software industry, including marketing and manufacturing support. If you have hardware/software skills in any of these areas, talk with us about a growth future in a massive growth field. Application Software, Digital switching systems, logic design, diagnostics, Software/Hardware interface and testing, data base systems, real-time systems design, CAD/CAM, mainframe design, micro/mini systems and design, and related areas

For more information about your growth future in Telecommunications, talk with one of our representatives. TODAY. Call Toll-Free: (800) 323-1966 or if in Illinois or surrounding areas call Toll-Free (800) 942-0491.

GTE AUTOMATIC ELECTRIC

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PERFORMANCE ANALYST

Conn. corp. seeks indiv. with IBM hdwre. performance, software monitor, T.P. network & OS/VS or MVS environment. Will provide Sr. staff consulting to lge. data center director. Salary $22,000+ (Fee paid). Contact Stan Durbas

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

SYSTEMS PROGRAMMER

OS/MVT, HASP & OS/VS2 (SVS/MVS) experience. Applicant must be a university graduate and have 3 years experience in systems programming OR any combination of university training & systems programming totaling 7 years with no less than 3 years in either. Salary range is $1205 to $1810 per month.

Excellent benefits and working conditions. Send resume to Personnel Office, Northern Illinois University, DeKalb, IL 60115.

An Equal Opportunity/ Affirmative Action Employer

SYSTEMS MANAGER

Major Pacific Northwest company has immediate opening for person with strong administrative and technical skills to direct staff of 15-20. Successful candidate will have managed large scale systems development projects in an IBM 370 environment. Degree in manufacturing or distribution experience preferred to 27K.

Other EDP opportunities available throughout the Pacific Northwest. For confidential interview call or write Al Friedman, (206) 455-8300. Executive Resources, Inc., 310 108th Ave. N.E., Bellevue, WA 98004. All fees paid.

Data Processing

OPERATIONS MANAGER LARGE COMPUTER CENTER

JOIN A COMPANY GROWING 40-50% PER YEAR

The Computer Services Division of American Management Systems, Inc., has an immediate need to fill the job of Operations Manager in its Arlington, Virginia Computer Center. The Center presently has a 370/165 and a 360/65 running under OS/HASP. Conversion to MVS is in progress. Customers access the AMS Center via RJE, WYLBUR and CICS, using local lines and the Telenet communications network.

The individual we seek must have the ability to coordinate effective use of all computer resources in a service environment, and direct the physical installation and integration of additional hardware.

Persons applying for this challenging position must satisfy the following requirements:

- Funcational knowledge of hardware to insure vendor performance and assist with planning.
- Experience as an operations manager in a large OS or VS environment with substantial teleprocessing.
- Experience in production scheduling and tape library management.
- Experience in development and enforcement of operational procedures.
- Demonstrated leadership qualities and personnel management experience.

In addition, the following qualifications are desirable:

- Experience in VS environment (either SVS or MVS)
- Ability to develop procedures for insuring TP network reliability
- Specific experience in setting up security procedures

Salary will be mid to upper 20's, depending upon experience. Excellent vacation, other fringe benefits.

This is a key position. Potential for profit sharing and stock options within two years.

Please send resume and salary history (do not phone) in confidence to:

Thomas E. Martin
Vice President
**AMERICAN
MANAGEMENT SYSTEMS, INC.**
1901 North Moore Street
Arlington, Virginia 22209
An Equal Opportunity Employer M/F

AMERICAN MANAGEMENT SYSTEMS INC
An Equal Opportunity Employer M/F

DATA PROCESSING OPPORTUNITIES

Division of NYSE corporation has 2 openings for experienced Data Processing personnel at our South Florida Corporate Offices.

SENIOR BUSINESS SYSTEMS ANALYST

Successful candidate with above average communication skills should possess the following credentials: Minimum 4 years proven track record in dealing with users to survey problems, evaluate alternatives, and design effective business computer solutions, 3 years business programming experience (prefer COBOL). A college degree, coupled with experience in the distribution industry (prefer soft drink bottling) plus a strong business rather than technical orientation should qualify you for this challenging position. 50% travel involved.

SENIOR PROGRAMMER/ANALYST

Seeking experienced individual with the following qualifications: minimum 4 years experience in COBOL programming, 1 year programming for 3270 terminal, 2 years experience working with users to meet their needs, experience with structured/top down programming coupled with at least 2 years of successful college studies. Experience in the following areas is desirable, but not mandatory: data/communications and System 3 experience.

Competitive starting salary offered with complete benefit package. Send your resume along with salary history in confidence to:

**CW Box 5101
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EDP CONSULTING

To cope with increasing business, a leading international consulting company needs aggressive, ambitious persons in several locations. If you have had systems design experience, sales or marketing with a mainframe vendor or prior consulting experience, and you would like to join an outstanding team, we would like to talk with you. This is an exciting opportunity with top salary and benefits. Outstanding advancement potential, and a highly professional atmosphere. We have openings currently in Los Angeles, Denver, St. Louis, Seattle, Portland and Houston.

For immediate consideration call

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John Gilbert
(213) 680-2500**
or
**Send resume to:
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Los Angeles, CA 90071**
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COMMUNICATIONS CAREERS

Washington, D.C. & Hawaii Facilities

We're Computer Data Systems, Inc., a dynamic computer services company with an ever-growing commitment to our business, financial institution and government agency clients. To enable us to expand our sphere of unparalleled quality services, we need experienced communications professionals in our Washington, D.C. and sunny Hawaii facilities. Applications are welcome in the following disciplines:

REAL-TIME APPLICATIONS

* ASSIGNMENTS

Through careful selection and assignment of top state-of-the-art consulting and developmental personnel, we've amassed an extensive automated communications systems capability. We're continuing to expand our efforts, and we need your expertise in the following areas:

* POSITIONS

Senior Communications Specialists, Senior Analysts, Programmer Analysts.

* REQUIREMENTS

Experience is desired in one or more of the following areas: ALC, BAL, COBOL, Univac Series 70 or 90/60, Real-Time Communications and Virtual Memory Systems.

But the ball doesn't stop there. We've got additional positions for competent personnel of all concentrations — and we'd like to talk with you about filling them.

You'll enjoy excellent starting salaries equal to your level of experience, company-paid medical and life insurance benefits, tuition assistance, and a high-powered professional environment with unlimited growth potential. Join us — send your resume or call:

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Computer Data Systems, Inc.
**7315 Wisconsin Avenue-200W
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make milgo your future

PROGRAMMING OPPORTUNITIES

SOUTH FLORIDA

Milgo Electronic Corporation, a leading manufacturer of data communication equipment, has immediate openings for qualified individuals in the following areas:

SYSTEMS SPECIALISTS

2-5 years systems analysis and programming experience with business applications. A knowledge of ANS Cobol in an on-line data base oriented environment required. Experience with Univac 1100 series computers helpful. College degree preferred.

PRODUCT DEVELOPMENT PROGRAMMERS

Experience writing assembler language programs to control peripheral devices with 8080 microprocessor or similar micro-minicomputer. Data communications experience helpful.

SOFTWARE SUPPORT SPECIALISTS

Knowledge of terminals and peripheral devices with experience in communication codes, software data-control protocols and microprocessor programming.

SCIENTIFIC ENGINEERING PROGRAMMER

Assembly language programming experience to do applications and systems programming. Experience in PDP 11/45 desirable.

Milgo offers excellent salaries, complete company benefits, liberal relocation policy and an opportunity to join a group of highly creative people in sunny South Florida. We invite your inquiries concerning a future with us. Send your resume in complete confidence to Dan Haynes, Job #COM-A82, or call collect (305) 591-5212.

Milgo Electronic Corporation
8600 N.W. 41st Street Miami, Fla. 33166
Equal Opportunity Employer

Oata Processing

SAN DIEGO SYSTEMS ANALYSTS

Salary to $1,555 mo.

The City of San Olegp has new systems applicetions in Police Department which create openings for qualified journey level Systems Analysts. Join our systems team in developing an area Regional Justice Information System.

Currently operate with IBM 370-145 in an OS/VS1. DAS/VS, DB/DC environment. Will soon go to IBM 370-158. Equal to college grad. and 2 yrs. in systems analysis, design AND programming in en ANS COBOL, JCL, OS (Rel. 21 or higher) environment. May substitute additionel OS or OOS exp. in an environment equal to, or greater than IBM 360-50 or 370-145 for up to 2 yrs. college. Exam process consists of personal interview, which may be done by phone after. application is approved.

CITY OF SAN OIEGO
Personnal
202 C St., San Olego, Ca. 92101
(714) 236 5793
An Equal Opportunity Employer

PROGRAMMER ANALYSTS SYSTEMS ANALYSTS

If you are interested in relocating to the beautiful Pecific Northwest, the State of Oregon hes positions available in the Salem area.

PROGRAMMER ANALYSTS

Positions at this level require three years of experience in programming with emphesis in systems design, Positions at this level involve both systems analysis and programming in the business application field using ANSI COBOL. Heavy use is made of IBM 370 computers and CICS on-line application design.

SALARY $1190 - $1522

SYSTEMS ANALYSTS

Positions at this level are involved in the design of large complex business applications, many of which use the CICS Teleprocessing system. Applicants should have four years of programming and systems analyst experience with a minimum of one year of analyst experience. Major epplications are designed using ANSI COBOL on IBM 370 computers.

SALARY $1251 - $1596

If you are interested in these positions, submit your resume' to:

State of Oregon
Personnal Division
100 Public Servica Bldg.
Salem, OR 97310

Is Your Career Stifled?

Digital's Educational Marketing Group Offers Unprecedented Opportunity

Digital's Educational Marketing Group, located in Marlboro, Massachusetts is firmly committed to being the premier source of computer systems, equipment and services for the Educational market. To accomplish this, we are seeking professionals with proven expertise in both the computer business and academia. Our new product lines include advanced, highly sophisticated large computer systems, for any aspect of an educational instition's needs . . . from servicing business applications to serving as students' learning tools.

Our marketplace is international and our Group is just beginning to grow. This is a ground-floor opportunity to build and advance with a group setting the goals and standards for things to come in one of the most rapidly expanding areas of the computer industry.

Marketing Managers

We're currently seeking self-starting professionals who can immediately make valuable contributions to our Marketing operations. You'll be responsible for defining new markets, planning, and strategies, product pricing and promotion, including business decisions affecting your areas. In short, you'll be a prime driving force in the marketing structure of this group.

Management positions are available in each of the following marketing areas: School Districts, Community Colleges, and Universities.

The ideal candidate will be an aggressive, creative Marketing professional with academic experience and a familiarity with this market. A knowledge of other systems and equipment in this field is essential. You should also be familiar with large systems and their applications in an academic/administrative environment. The personal qualities that will enable you to contribute to and help direct the Group's growth — decisiveness, ambition, and excellent interpersonal skills — are very important. In addition, you should have a Bachelor's degree in a relevant field, or equivalent, with an MBA preferred.

For the right person, we offer a very attractive salary and benefits package, plus the opportunity to go as far as your talents will take you with a world leader in the industry. To further investigage these positions, please forward your resume, including salary history to Doug D'Agata, Digital Equipment Corporation, 200 Forest Street, Marlboro, Massachusetts 01752.

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You'll be thoroughly trained and become highly proficient in our software programs and those of our competitors. You'll travel extensively in the U.S. and Canada, from a Northern New Jersey base.

The job is challenging, the standards are high. So is the compensation. It's the kind of job where you can use your brains and energy to life your income.

If you thrive on challenge and meet the rest of the standards, we'd like to talk to you. Send a confidential resume to:

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Like to shoot dumps? Amdahl needs:

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You should have good MVS internals experience and the ability to debug, plus expertise in one of the following areas:

- VTAM/NCP
- JES 3
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Current openings are in Sunnyvale, California.

Like customer contact? Amdahl needs:

SYSTEMS ENGINEERS

At customer locations. You should have MVS diagnostic expertise and the ability to be a jack-of-all-trades.

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Current openings are in Sunnyvale, California.

NO MVS EXPERTISE? Drop us a note anyway. We also have systems engineering openings that do not require MVS experience.

Please direct your response to Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 and indicate 310-D on your resume or letter. We are, of course, an equal opportunity employer.

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Data Processing

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At CNA Insurance, innovation is never on vacation. We're constantly looking for the new way—the better way...and that applies to our internal operations as well as our marketing approach. The current expansion of our Information Services Division-Claims Systems is an example of things to come!

We're adding to our staff in many ways and that means excellent ground-floor opportunities and high visibility for the professionals who join us. If you'd like to be a major contributor in a rewarding, highly competitive environment, take a look at these openings:

PROGRAMMERS

In addition to several junior level programmers who have some COBOL programming experience and preferably some knowledge of IMS Data Base, we're also looking for more advanced programmer analyst/ consultants who can bring 4-6 years programming experience including COBOL and IMS Data Base to these positions.

PROJECT LEADER

This position has hands-on involvement and direct functional responsibility for several analysts and consultants on medium and large scale projects for claims processing. A degree in Business, Computer Science, Insurance or Math backed by at least 7 years experience in systems and/or personal and commercial insurance (systems related) will be essential. Excellent written/verbal communications ability is a must and a background in claims related processing is preferred.

SYSTEMS ANALYSTS

Successful candidates for these challenging positions will analyze current group systems and future requirements for new systems in the claims area. Responsibilities include collection/analysis of factual material on current systems, interviewing various users, defining informational needs, and documenting findings and recommendations.

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As a Project Supervisor for Manual. Systems Development you will have project leadership responsibility for the analysis, design and implementation of major corporate systems. Requirements are five to seven years of systems analysis and design experience in the area of manual administrative processing systems. One to two years experience in project leadership, planning and control is also required.

We are presently looking for project supervisors with insurance industry background – claims experience preferred.

SENIOR SYSTEMS ANALYST

As a Senior Analyst for Manual Systems Development you'll be responsible for the design and implementation of the manual (people) portion of large corporate systems projects. Requirements are three to four years experience in manual systems design and methods, with a thorough knowledge of project planning and administrative processing techniques. Project leadership and effective communication abilities are a must.

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field engineering

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We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sonnyvale, CA 94086. We are, of course, an equal opportunity employer.

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in California on full salary with housing, transportation, and other expenses provided.

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You will have a minimum of 5 years' experience in maintaining large-scale systems with in-depth training on compatible CPUs. You will have company support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. Openings in several major cities and at Amdahl headquarters in California. Please indicate 560-E on your response.

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You will carry the Amdahl philosophy of customer service as well as your expertise into the field, utilizing your initiative and talents to aid the customer in restoring computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Please indicate 567-3E on your response and direct it to the Amdahl regional office nearest you as shown below.

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Sunnyvale, California 94086

Amdahl Corporation
680 Fifth Avenue
New York, New York 10019

Amdahl Corporation
2021 Spring Road
Oak Brook, Illinois 60521

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The State University of New York at Buffalo is expanding its senior systems staff to meet a challenging growth demand. Qualified candidates may expect to lead a wide variety of operating system software development and maintenance activities in support of research and instructional computing. SUNY/AB is currently supporting local batch, remote batch and time-sharing on a COC CYBER 173 under NOS. Development of a hierarchical distributed computing network and scheduling/queue-management software is planned for the near future. Substantial systems programming experience on large scale time sharing operating systems is required. In addition, candidates should have particular expertise with internals of language processors, I/O handlers, job and resurce schedulers, telecommunications software, or performance measurement and evaluation techniques. Experience with KRONOS, NOS, COC software, hardware and more than one operating system would be helpful. Salaries competitive. Excellent fringe benefits. Eligibility for future permanent appointment.

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Academic Computing Center
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Function as project leader and systems analyst on large computer information systems projects with complete responsibility for design, development and implementation. Position requires bachelor's degree and seven years experience. Accounting, financial, or engineering background is desirable.

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Responsible for the development of internal EDP technical standards and procedures. Includes auditing of installation activities to ensure adherence to established standards and procedures. Position requires a capable technical writer, with current programming experience, systems analysis and design experience and experience in developing EDP standards and procedures.

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Responsible for the development and maintenance of teleprocessing supervisory control programs. Position requires bachelor's degree, five years programming experience, extensive assembler language experience, and working knowledge of COBOL, TCAM, TSO, CICS and IBM JCL.

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St. Petersburg, Florida 33713
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PROGRAMMER/ ANALYST
CICS

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Please reply to:
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Data Processing
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If you are a highly motivated self-starter who can conceptualize what is required to solve specific problems and then develop the resources to solve the problems within a dynamic, unstructured environment, we would like to talk to you.

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SYSTEMS PROFESSIONALS

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PROGRAMMER/ANALYSTS

We need several individuals to work on state-of-the-art distributive processing systems to support our field operations. Qualified candidates will possess 3-5 years of programming experience in Assembler or COBOL and the following skills:

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- Batch teleprocessing
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SYSTEMS ANALYSTS

Responsible for administration and technical management of multiple automated systems from feasibility study through implementation. Position requires demonstrated success in the design and implementation of major systems projects, prior supervisory responsibility, project planning/management skills, familiarity with data base management and telecommunications concepts, and proficiency in COBOL. The applicants must also demonstrate excellent written and oral communications skills.

SYSTEMS PROGRAMMERS

To work in the areas of DS and HASP maintenance, data base management systems (DL/1 and others), telecommunications, and capacity management. Position requires experience with DS/MFT OS/MVT, HASP, assembler language, JCL, and utilities. Experience with teleprocessing systems and data base systems (particularly DL/1) also desirable.

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Multnomah County Data
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MetriData Computing, a leading computer service company in the Midwest, is in need of experienced sales representatives. Qualified candidates will have three to five years of data processing sales experience. Must have ability to direct large account sales efforts of our Remote Computing Services. Compensation commensurate with experience and performance.

Send resume, in confidence, to:

Mr. Gene Schulstad
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P.O. Box 21099
Louisville, Kentucky 40211

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EOE-M/F

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Requires recent IMS experience. Applications programming background should include information systems and financial and management reporting.

CUSTOMER SUPPORT REPRESENTATIVES

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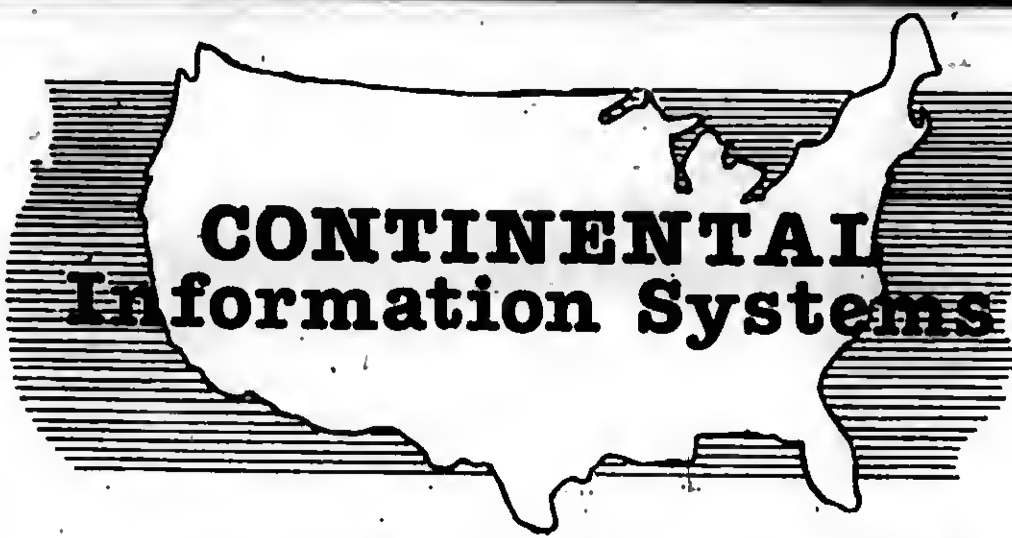

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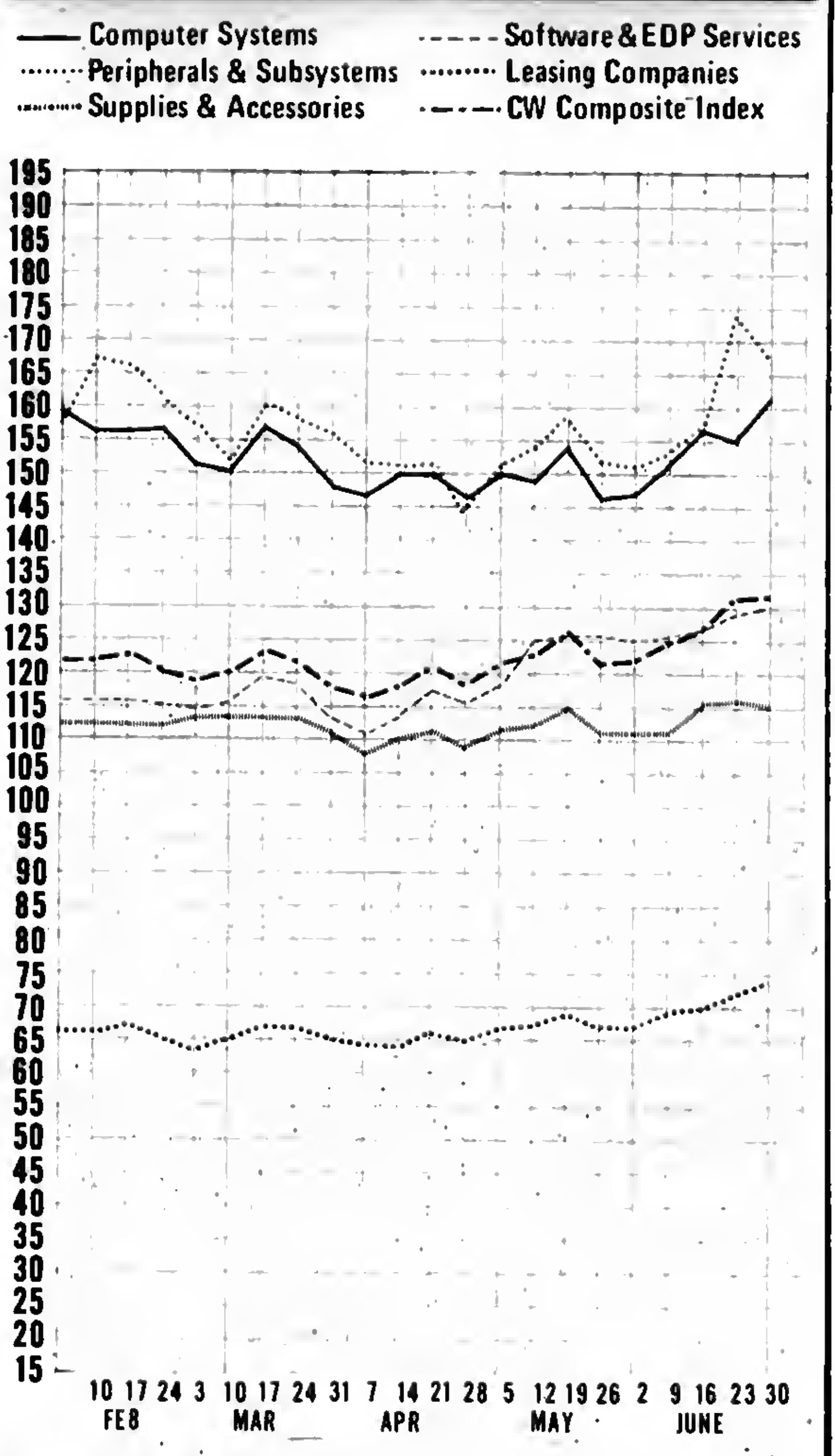

Earnings Reports

ANALOO OEVICES

Three Months Ended April 30

	1977	1978
Shr Ernd	$.32	a.$29
Revenue	11,979,000	9,755,000
Eernings	545,000	475,000
6 Mo Shr	.82	a.53
Revenue	22,583,000	18,323,000
Earnings	1,061,000	879,000

a-Adjueted to reflect 5% stock dividend paid in April 1977.

OATA TECHNOLOOY

Yeer Ended April 30

	1977	1979
Shr Ernd	.....	$.50
Revenue	$9,907,000	10,502,000
Earnings	(5,000)	910,000

BALL

Three Montha Ended April 3

	1977	1979
Shr Ernd	$.64	$.70
Revenue	105,934,000	94,609,000
Earnings	2,995,000	3,235,000

CAMBRIOOE MEMORIES

Three Monthe Ended Novembar 27

	1979	1975
Shr Ernd	$1.93	$(.39)
Revenue	1,991,000	4,719,000
eSpec Cred	2,632,000	......
Eernings	2,764,000	(659,000)

a-From sele of memory equipment previously leesed to customers.

COMPUTER AUTOMATION

Three Months Ended April 3

	1977	1979
Shr Ernd	$.92	$.43
Revenue	12,056,339	7,997,455
Earnings	1,820,709	941,500
9 Mo Shr	1.79	1.14
Revenue	29,999,211	22,331,977
Earnings	3,499,419	2,213,466

COMPUTER PROOUCTS

Three Monthe Ended April 1

	1977	1976
Shr Ernd	$.11	e$.09
Revenue	1,993,269	1,349,650
Earnings	159,924	113,417

e-Adjusted for 20% stock dividend in November 1976.

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Computerworld Stock Trading Summary

CLOSING PRICES WEONESDAY, JUNE 29, 1977

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		PRICE 1977 RANGE 111	CLOSE JUN 29 19TT	WEEK NET CHNGE	WEEK RCT CHNGE
	COMPUTER SYSTEMS				
O	AHOAHL CORP	0- 39	26	+2 1/4	+9.4
N	BURROUGHS CORP	55- 91	61 5/8	+2 1/4	+3.7
O	COMPUTER AUTOMATION	18- 28	26	+ 1/4	+0.9
N	CONTROL OATA CORR	20- 26	21 1/2	+ 1/8	+0.5
N	OATA GENERAL CORR	35- 47	45 3/8	+2	+4.6
N	OATAPOINT CORP	18- 30	27	+1 5/8	+6.4
N	OIGITAL EOUIPMENT	37- 53	4T 1/4	+ T/8	+1.8
N	ELECTRONIC ASSOC.	2- 3	2	+ 1/4	+14.2
A	ELECTRONIC ENGINEER.	8- 10	8 1/4	- 5/8	-T.0
O	FOUR-PHASE SYSTEMS	13- 17	15 3/8	+ 1/4	+1.6
N	FOX6ORO	42- 54	50 5/8	- 1/2	-0.9
O	GENERAL AUTOMATION	6- 9	T	+ 1/8	+1.8
O	GRI COMRUTER CORR	1- 1	5/8	0	0.0
N	HEWLETT-RACKARO CO	69- 87	78 3/4	+1 3/4	+2.2
N	HONEYWELL INC	44- 55	53 7/8	- 1/4	-0.4
N	IBM	245-286	265 1/4	+4 7/8	+1.9
O	MANAGEMENT ASSIST	5- 9	6 3/8	+1	+18.6
O	MEMOREX	23- 29	24 1/8	+1 5/8	+T.2
O	NICROOATA CORP	T- 16	9 1/2	+ 1/4	+2.T
O	MOOULAR COMRUTER SYS	5- 8	7 5/8	+ 1/4	+3.3
N	NCR	32- 38	36 T/8	+ 3/6	+1.0
O	PRIME COMPUTER INC	12- 17	15 3/4	+ 1/4	+1.6
N	RERKIN-ELMER	17- 21	20 5/8	+ 3/4	+3.7
N	RAYTHEON CO	16- 33	30 5/8	- 3/4	-2.3
N	SRERRY RANO	34- 42	37	+ 1/2	+1.3
O	SYCOR INC	8- 15	10 3/4	+2 3/8	+28.3
A	SYSTEMS ENG. LABS	5- 7	6	- 1/4	-4.0
N	VARIAN ASSOCIATES	15- 21	20 1/4	- 3/4	-3.5
A	WANG LABS.	14- 18	17	+1 5/8	+10.5
	LEASING COMPANIES				
O	BOOTHE COURIER CORP	6- 10	9 1/4	+ 1/2	+5.T
O	COMOISCO INC	10- 13	10	+ 1/4	+2.5
A	COMMERCE GROUP CORP	2- 2	2 1/8	+ 1/8	+6.2
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
M	OATRONIC RENTAL	1- 2	1	0	0.0
A	OCL INC	1- 2	1 7/8	+ 1/8	+T.1
N	OPF INC	6- 8	T 3/4	+ 1/8	+1.6
N	ITEL	13- 19	1T 3/4	+ 1/8	+0.7
N	LEASCO CORP	19- 24	22 3/4	+1 3/4	+8.3
O	LEASPAC CORP	1- 2	T/8	- 5/6	-41.6
O	NRG INC	0- 0	1/8	-	-33.5
A	RIONEER TEX CORP	5- 11	5 5/8	- 1/8	-2.1
N	U.S. LEASING	10- 14	13 7/8	0	0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
111 TO NEAREST DOLLAR

EXCH		PRICE 1977 RANGE 111	CLOSE JUN 29 197T	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EOP SERVICES				
O	AOVANCEO COMP TECH	1- 2	1 1/4	- 1/8	-9.0
O	ANACOMP INC	7- 9	8 T/8	+ 1/2	+5.9
A	ARPLIEO OATA RES.	5- 9	9	0	0.0
N	AUTOMATIC OATA PROC	23- 30	28 1/2	+ 1/2	+1.T
O	COLEMAN AMERICAN COS	2- 2	1 T/8	0	0.0
O	COMPU-SERV NETWORK	10- 15	12 1/2	+ 1/2	+4.1
O	COMR ELECTION SYSTMS	6- 9	9 1/8	+ 3/8	+4.2
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- T	5 7/8	- 1/8	-2.0
N	COMPUTER SCIENCES	7- 9	T 7/8	+ 1/4	+3.2
O	COMRUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	2- 3	1 5/8	- 1/8	-T.1
O	COMSHARE	5- 7	4 3/4	0	0.0
O	OATA OIMENSIONS INC	4- 5	3 5/8	- 1/8	-3.3
O	OATATAB	1- 2	1 7/8	- 1/8	-6.2
N	ELECTRONIC OATA SYS.	16- 20	19 1/2	+ 1/8	+0.6
O	INSYTE CORP	2- 3	1 T/8	+ 1/4	+15.3
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 5/8	- 3/8	-9.3
O	KEYOATA CORP	2- 3	2	0	0.0
A	LOGICON	T- 17	17 1/4	+ 1/8	+0.T
A	MANAGEMENT OATA	1- 2	1 1/4	+ 1/8	+11.1
A	NATIONAL CSS INC	19- 25	21	+1 3/8	+T.0
O	NATIONAL OATA CORP	4- 7	5 1/4	- 1/8	-2.3
A	ON LINE SYSTEMS INC	1T- 22	18 1/8	- T/8	-4.6
N	PLANNING RESEARCH	3- 5	4 1/4	+ 1/8	+3.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIOATA INC	2- 3	2 1/4	0	0.0
O	REYNOLOS & REYNOLO	1T- 20	18 3/4	+ 3/4	+4.1
O	SCIENTIFIC COMPUTERS	1- 3	3	- 1/8	-4.0
O	TYMSHARE INC	14- 20	18 3/4	+1 1/4	+T.1
A	URS SYSTEMS	4- 5	4 1/2	- 1/4	-5.2
N	WYLY CORP	1- 2	1 1/4	- 1/8	-9.0
	PERIPHERALS & SUBSYSTEMS				
N	AOORESSOGRAPH-MULT	10- 14	14 3/6	+1 1/8	+8.4
O	AOVANCEO MEMORY SYS	T- 9	8	+ 1/2	+6.6
N	AMPEX CORP	8- 10	10 1/4	+1 1/4	+13.8
O	ANOERSON JACOBSON	3- 4	3 3/4	+ 3/8	+11.1
N	APPLIEO OIG OATA SYS	10- 16	14 1/4	+ 1/8	+0.8
O	BEEHIVE INT'L	8- 12	9 3/8	+ T/8	+10.2
A	BOLT,BERANEK & NEW	T- 8	6 7/8	+ 1/4	+3.T
N	BUNKER-RAMO	8- 12	10 1/4	+ 7/8	+9.3
A	CALCOMP	3- 5	3	0	0.0
O	CAMBRIOGE MEMORIES	1- 3	2 1/4	+ 1/4	+12.1
N	CENTRONICS OATA COMP	22- 29	26 5/8	-1 1/4	-4.4
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 6	6 3/8	+ T/8	+15.9
O	COMPUTER CONSOLES	4- T	6	0	0.0
A	COMPUTER EOUIPMENT	2- 3	3 1/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1	0	0.0
O	COMTEN	9- 13	11 3/4	+ 1/4	+2.1
N	CONRAC CORP	19- 28	23 1/2	-1 3/4	-6.9

EXCH		PRICE 19TT RANGE 111	CLOSE JUN 29 19T7	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	4	- 1/4	-5.8
O	OATA 100	6- 8	6 3/4	- 5/8	-8.4
A	OATA PROOUCTS CORP	9- 13	12 5/8	+ 3/4	+6.3
O	OATA TECHNOLOGY	3- 4	4	0	0.0
O	OATUM INC	1- 2	1 5/8	+ 1/8	+8.3
O	OECISION OATA COMPUT	2- 2	2 1/4	0	0.0
O	OELTA OATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	3 3/4	- 1/2	-11.7
O	FABRI-TEK	1- 2	1 1/8	-	-4.9
O	GENERAL COMPUTER SYS	0- 2	1 3/8	+ 1/8	+10.0
N	HAZELTINE CORP	9- 12	9 3/4	+ 1/8	+1.2
N	HARRIS CORP	28- 39	37	- 1/2	-1.3
A	INCOTERM CORP	11- 15	11 3/4	- 3/8	-3.0
O	INFOREX INC	4- T	4 1/2	+ 1/8	+2.8
O	INFORMATION INTL INC	9- 14	9 1/4	0	0.0
O	INTEL CORP	38- 57	48 1/2	+2 1/2	+5.4
A	LUNDY ELECTRONICS	3- 6	4 3/8	+ 1/4	+6.0
O	MSI OATA CORP	6- 10	9 3/8	+ 3/8	+4.1
N	MOHAWK OATA SCI	5- 8	5 5/8	+ 3/8	+T.1
O	PENRIL CORP	2- 5	4 3/8	+ 1/6	+2.9
A	PERTEC CORP	T- 9	8 3/8	+ T/8	+11.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 T/8	- 1/4	-6.0
O	RECOGNITION EQUIP	6- 10	8 1/2	- 1/8	-1.4
O	SCAN OATA	1- 2	1 5/8	- 1/8	-7.1
O	STORAGE TECHNOLOGY	10- 15	14 5/8	+ 5/8	+4.4
O	T BAR INC	T- 11	10 3/8	- 1/4	-2.3
O	TALLY CORP.	4- 6	4 1/8	- 1/4	-5.7
O	TEC INC	7- 10	8 7/8	+ 1/4	+2.8
N	TEKTRONIX INC	29- 36	35	- 1/2	-1.4
N	TELEX	2- 3	2 T/8	- 1/8	-4.1
O	WILTEK INC	1- 1	1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	2- 4	1 3/4	+ 1/8	+7.6
A	BARRY WRIGHT	10- 14	13 1/4	- 3/4	-5.3
O	CYBERMATICS INC	1- 1	5/8	0	0.0
O	OUPLEX PRODUCTS INC	14- 18	16 3/4	- 5/8	-3.5
N	ENNIS BUS. FORMS	6- T	6 1/4	+ 1/8	+2.0
O	GRAHAM MAGNETICS	11- 14	13 1/2	- 1/2	-3.5
O	GRAPHIC CONTROLS	15- 19	16 1/2	0	0.0
N	3M COMPANY	48- 56	49 5/8	- 3/8	-0.T
O	MOORE CORP LTO	28- 3T	28 1/4	- 1/2	-1.T
N	NASHUA CORP	16- 22	20 3/4	+ 3/8	+1.8
O	STANOARO REGISTER	18- 25	22 1/2	-2	-8.1
O	TAB PROOUCTS CO	13- 17	16	- 1/4	-1.5
N	UARCO	19- 22	20 1/4	+ 1/4	+1.2
A	WABASH MAGNETICS	10- 15	14	- 3/8	-2.6
N	WALLACE BUS FORMS	1T- 21	1T 3/4	+ 1/2	+2.8

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Booms Away

By Ann Dooley
Of the CW Staff

LOS ANGELES — Noise pollution is being studied and often reduced at several airports across the country using a computerized monitoring system that can separate jet aircraft noise from other noise.

Installed in communities bordering airports in San Diego, Los Angeles and Ontario, Calif., as well as in Hawaii and Washington, D.C., the systems rank the severity of aircraft noise in the area in comparison with other neighborhood sounds such as cars, trucks, lawn mowers and bark-

(Continued on Page 6)

Unsigned IBM Trial Paper Pops Up Again – Identified

By Edith Holmes
Of the CW Staff

NEW YORK — The U.S. antitrust case against IBM has always been a battle of papers — internal IBM papers.

Now, in one of the more puzzling aspects of the case, a new set of papers indicates IBM attorneys and executives may have known more about certain documents than they previously admitted in court.

The whole matter resembles a jigsaw puzzle and government attorneys are just now putting together the pieces of this particular part of the puzzle — even as their case goes into its final stages.

The flap started last Oct. 19, when government attorneys subpoenaed seven IBM executives to appear in court in order to identify certain unsigned documents taken from IBM files [CW, Oct. 25].

Such identification is important. IBM attorneys have argued the documents should not be given credence by the court unless the Justice Department can show who within IBM wrote them and who received them. Without such identification, they cannot be considered business records of the corporation.

The group never testified. Referring to one of the documents headed "Action," lead IBM counsel Thomas D. Barr told the judge and government attorneys that "none of [these] persons know who wrote the document, wrote it themselves or ever saw it before to the best of their recollection."

Appearing outraged, Barr called the government's subpoena of the IBM executives "nothing more than a case of blackmail."

Shift of Scene

Almost two months later, on Dec. 20, the government again introduced documents. An IBM counsel identified one of them as having been written by L.L. Spector, IBM business practices adviser.

The name Hilary Faw, then director of business practices and now IBM assistant treasurer, was signed on the document by Spector since Spector worked for him at the time, the attorney said.

Both Faw and Spector were among the seven executives in court on Oct. 19, but the new document did not connect them with the earlier document, of which their attorneys claimed no knowledge.

Then, on June 8 of this year, Judge David N. Edelstein released certain documents to the government after stripping IBM's previous claim of "privilege."

In this group of documents there was a surprise — a six-page flip chart presentation which essentially included both of the earlier documents, the one identified as having been written by Spector and bearing Faw's signature as well as the one that no one could previously identify.

The presentation, made on Dec. 9, 1968 to a meeting of IBM's general managers, is entitled "Share Measurements Change: Why and Action." The presentation was made by Faw with the blessing of Frank T. Cary, now IBM chairman and then a senior vice-president and general manager of the DP group — and one of the IBM executives said to be unable to identify the Oct. 19 document.

Since one page of this new document is essentially the same as the one previously

(Continued on Page 3)

Plans Study, Quick Action

Carter Team Eyeing Federal DP Revamp

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — Even DP has not escaped the scrutiny of Carter Administration officials looking for ways to streamline the government.

The President's Reorganization Project in the Office of Management and Budget (OMB) has begun a comprehensive examination of all federal DP procurement and management, according to project associate director Wayne G. Granquist.

"The management of federal DP resources is a significant factor in the delivery of governmental services and the operations of government," Granquist said in a recently circulated letter which noted that in this fiscal year the government "will spend over $4 billion and employ more than 150,000 people in the area of general-purpose DP."

At the same time, "there is a growing recognition these resources are not being acquired and managed in the most economic and efficient manner," Granquist said in asking for advice on the reorganization of federal DP resources from people both within and outside the government.

Thre is also concern that this technology "represents a threat to individual privacy," the government official added.

The study project, organized into half a dozen or more task forces, will focus on three basic areas, the director said:

- Improving productivity in the delivery of government services through the application of computer technology.
- Improving the acquisition, management and use of these resources.
- Eliminating duplication and overlap in agency jurisdictions dealing with computer questions.

With those objectives, the project also has three basic criteria, he added. It should be based on "careful and comprehensive analysis" and it should be conducted in a way that permits "the largest number of people" in and out of government to be involved.

Finally, it should be a "decision-forcing, action-oriented process," Granquist said.

In essence, Granquist's job in this and other reorganization efforts is "trying to capitalize the 'M' in OMB," he told the Interagency Committee on Automatic Data Processing when he addressed that group in June.

Granquist's letter invited addressees to submit comments to him on the "issues, problems and solutions" that should be considered by the project. He urged recipients to make copies of the letter for other persons and organizations "who might be interested in submitting separate responses."

Even without a copy of the letter, anyone with an interest in the management of the federal DP resources is welcome to send in comments, OMB noted. Although Gran-

(Continued on Page 6)

Justice Puts Brakes On FBI Switching, Plans Further Study

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — The Justice Department has formally revoked a memorandum authorizing the Federal Bureau of Investigation (FBI) to develop a computerized message-switching system.

The system, which would serve but could also monitor the communications functions of state and local law enforcement agencies, was turned down by the Ford Administration as a threat to privacy and civil liberties. The message-switching plan brought cries of "Big Brother" from congressional critics who had hoped the plan was dead. However, the system surfaced again recently [CW, June 27].

The revocation came in a memorandum from Deputy Attorney General Peter F.

(Continued on Page 6)

Ifip Congress Next Month Set To Face Wide Variety of Issues

By E. Drake Lundell Jr.
Of the CW Staff

TORONTO — The world's most comprehensive program on important computer issues took place last month at the National Computer Conference, right?

Wrong.

The 1977 Congress sponsored by the International Federation for Information Processing (Ifip) here next month promises to earn that title with 108 technical sessions and 30 "mini" symposia on a wide variety of issues ranging from the forefront of technology to nitty-gritty data center management.

In addition, Ifip promises an in-depth examination of important social issues facing the computer community and society at large when the Congress meets Aug. 8-12.

All sessions will be available in English

The effect of computers on employment will be highlighted in two of the social issues sessions. The first of these, chaired by U. Briefs of West Germany, will discuss the overall effects of the introduction of computers on the job market with speakers from the U.S., Denmark and Canada.

The second, under the direction of F. Margulies of Austria, will delve into the "Impact of Computerization on Work Content and Job Satisfaction" with speakers from Denmark, Sweden and Hungary.

Most of the major countries in the Western industrialized world including the U.S., Canada, France and West Germany will be represented on another panel dealing with "the Social Accountability of Computing" which will be chaired by R. Kling of the

(Continued on Page 2)

COMPUTERWORLD

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Ifip to Face Wide-Ranging DP Issues

(Continued from Page 1)

United States.

"Is the Erosion of Privacy an Unavoidable Consequence of Computer Applications?" will be the question for a panel headed by F. Gallouedec-Genuys of France that will draw on expertise from Australia and Sweden.

The final session targeted for dealing with social issues will delve into the "Impact of Computerization on Leisure Activities" and will be chaired by H. Borko of the U.S. with participation from British, Danish and Canadian speakers.

Besides those five sessions specifically on social issues, several others will also touch on areas of societal concern, including "Safer Use of Computers," "Distributed Systems: Operational and Privacy Requirements," "Economics, Organizational and Social Implications of Computer-Aided Design," "Systems for Public Planning and Control," "Models of the Environment" and "Data Bases, Business Systems and Privacy."

In addition to the social impact sessions, Ifip will also look into the crystal ball to help define the future of computing with such sessions as "Future Potentials in Computer Communication," "Data Networks Past, Present and Future," "Future of Data Management," "The Impact of Microcomputers on Computing," "Future Directions in Information Management" and "Future Directions in Computer Architecture."

Artificial Intelligence

There will be several sessions on the esoterica of artificial intelligence, but session organizer Y.D. Shmyglevsky of the Computer Center of the Academy of Science in Moscow noted the area may not be all that esoteric.

"There is a firm conviction among researchers that the 'human' style of 'user/-computer interaction, long envisioned by science fiction writers, will become a reality in the near fuure," Shmyglevsky stated.

In another area, Prof. Eric Manning of the University of Waterloo in Canada said the combination of computers and communications will make computer power as accessible as electricity.

"The same technology used for telephone lines, cable TV systems and space satellites now links computer terminals to remote computers and computers to each other. Telecommunications facilities already permit people to use computers across town, across the country and even in other countries.

"Great as their potential is, there are still many unresolved problems which the invited and contributed papers at the Congress will examine," Manning, who organized the communications section of the program, added.

In still another area, Prof. R.I. Tricker of the Oxford Center for Management Studies in England will focus on the impact of information systems on organizational thinking.

In a modern society, he said, information is increasingly connected with the exercise of power, but many existing information systems fail to respond to this challenge.

Looking beyond the technical and operational level, he said that management information is ultimately the outcome of human thought and that the information system designer now has the potential to contribute to the further evolution of his organization.

The conference program will also draw a large number of speakers looking into such topics as programming management, data base design, information systems development, modeling, program structure and specifications as well as other topics of interest to software developers and users.

Educators will also have a wide choice of sessions, ranging from ones on computer science programs to the use of computer-assisted instruction. Computer scientists will be treated to sessions ranging from finite elements and numerical analysis to the theory of data bases and programs.

The wide-ranging program, in which experts from more than 40 countries will participate, will feature 124 papers culled from 511 submitted for the program, in addition to 24 papers specifically requested from various experts in the industry worldwide.

Although it will be held on the North American continent for the first time since 1965, the Ifip program will be truly international in scope with speakers from — among others — the USSR, Japan, East and West Germany, Italy, France, Poland, Hungary, Sweden, Denmark, The Netherlands, the UK, Australia, Austria, Norway, Iran, India, Israel, Switzerland, Belgium, Finland, Nigeria, Hong Kong, Bulgaria and Mexico, as well as large U.S. and Canadian contingents.

Registration fees for the conference are $145. Forms and additional information can be obtained from the Organizing Committee for Ifip Congress 77, c/o Canadian Information Processing Society, Suite 214, 212 King St. West, Toronto, Ont., Canada M5H 1K5.

Room for Exhibits

TORONTO — While the International Federation for Information Processing's (Ifip) Congress 77 here next month promises an action-packed technical program, the exhibit space is still not sold out, and late starters still have a chance to join the 130 exhibitors already signed up for the show.

The 130 already participating will occupy approximately 260 booths, Ifip organizers said last week. There is room for 325 booths in the Sheraton Center exhibition hall here, the site for both the exhibit and technical sessions.

Information on exhibiting can be obtained from the Exhibits Manager, Ifip Congress 77, American Federation of Information Processing Societies, 210 Summit Ave., Montvale, N.J. 07645.

CDC Loses Account After IBM Testimony

NEW YORK — Control Data Corp. lost an $800,000 account with Sollac, a French firm, after one of the Minnesota-based company's employees testified at the U.S. vs. IBM antitrust trial recently [CW, June 27].

Although CDC sent a letter of apology to Sollac, for any embarrassment caused by the testimony of Gordon Brown, CDC's vice-president in charge of marketing and planning, the customer still decided to order IBM plug-compatible disk drives from Itel Corp.

Brown had testified that Sollac was reconsidering an order for a CDC disk drive after it learned IBM may soon be announcing an enhanced version of its 3350 disk drive.

Sollac was visited by IBM representatives as a result of the testimony, and the French DP manager complained to CDC that the preannouncement information was given to CDC in confidence.

In CDC's letter of apology, the company called the situation a result of an "erroneous interpretation" on its part.

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Anonymous IBM Trial Document Reappears — Identified Now

(Continued from Page 1)

identified as having been written hy Spector, government attorneys have concluded the entire June 8 document was written by Spector or by Spector and Faw under the direction of Cary.

Crucial Documents

All of the documents concerned are important because they involve an internal IBM program called "Project Yardstick" that changed the way IBM collected market share statistics.

The government has contended that Yardstick — which was instituted after the firm knew it was under antitrust investigation — was designed to make IBM's share of the market look less monopolistic. The previous measurement system, accoridng to the government, showed IBM had market dominance.

The newly released six-page presentation document itself states the business, antitrust and legal reasons why IBM executives thought they needed to change the corporation's ways of measuring its share of the computer market.

Having told the Justice Department how to measure the market in the computer industry and what general scope of products should be included in that industry, the presentation pointed out that IBM's internal measurements did not agree with what the government had been told.

Records to Reflect Thoughts

"We must have our records reflect our thinking. We must not put IBM's executives in an untenable legal position relative to market share data in their files if they were to be called to testify in the future," the exhibit stated.

Furthermore, IBM's outside legal counsel had requested that the changes in share measurement be made, the document noted.

The fifth page of the presentation document — headed "Action" — suggested the elimination of "net position" in share measurements. The DP group should be responsible for implementing improved competitive measurements, and changes should apply to all components of the group, this page stated.

Some management personnel would be reluctant to make these changes, the document continued, noting the changes would make the IBM market share appear to go down.

The same day Faw made the presentation, Cary ordered the recommended changes to take place, effective in January 1969.

When Barr made his report to the court last October concerning the "action" documents and his and the seven IBM executives lack of knowledge about it, he stated: "There are many documents in the IBM Corporation headed 'Action.' There are a suhstantial number which I have seen in the last few days which have subject matters on them not terribly different, or somewhat similar, or vaguely related to the same subject matters on this sheet of paper.

"I do not know who wrote the document. I have looked very diligently," Barr added.

The IBM attorney then maintained the government could not offer the "Action" document as the view of IBM management and as an admission of the corporation and a husiness record without knowing who wrote it.

Lead government counsel Raymond M. Carlson responded last fall hy stating that much of what Barr had told him about the document that day was exactly the kind of information the Justice Department sought.

IBM's claim of privilege for portions of many documents confused the government's receipt of them in the proper form and illustrated "the advantage to a corporate defendant of the tool of privilege to delay a trial proceeding," Carlson said then.

Barr, contacted ahout the apparent discrepancy just before press time, denied he now knows any more about the documents in question than he did last October.

Pointing out that he "didn't have the whole thing in my head," Barr said, "certainly if I knew of anything inconsistent with what I told the court I would have said so."

The inference that Spector wrote an entire document merely because he wrote one page of it is "kind of thin," he added.

Correction

The college curriculum described in "University Producing Grads 'Pretrained' in Business DP" [CW, May 2] is offered hy the State University College at Buffalo and not hy the State University of New York at Buffalo.

DP Buyer Charged With Kickbacks

NEW YORK — The U.S. Attorney's office in the southern district of New York has brought hefore a grand jury here its second case of kickbacks involving the purchase of computer paper supplies.

The jury indicted a former Pan American World Airways purchasing official, William Hasenstab, for allegedly receiving $45,000 in kickbacks from Tabulating Stock Forms, Inc. as a result of selecting that firm as a supplier for the past 11 years.

Hasenstab is scheduled to be arraigned July 14. No trial date has been set, according to John Wing, assistant U.S. attorney.

Tabulating Stock Forms was also named in the case involving Hartz Mountain Corp., in which a former Hartz official, Eugene Corey, received concurrent one-year prison sentences on three counts [CW, Feb. 7].

In that case, Corey was charged with receiving kickhacks of more than $60,000 from Tahulating as well as from Commercial Forms, Inc., while the paper companies made short shipments to Hartz amounting to more than $125,000.

George Barney, president of Tahulating, has not heen sentenced yet and Donald H. Krasner, president of Commercial Forms, cooperated with the government and received a suspended sentence, Wing said.

In the Pan Am case, Tahulating is named as a coconspirator and charged with two counts, conspiracy and fraud, for which the maximum sentence is 10 years, according to Wing.

A Pan Am spokesman had no comment on the matter, adding Hasenstah resigned last spring.

ADR's Automated System Charter™ (ASC) Helps Mobil Oil Stay Ahead

Change at Mobil Oil's New York Headquarters DP Department is a way of life. Over 300 systems are in constant use. And this year 100 systems may be extensively changed and 20 new ones added. "Maintaining up-to-date, standardized systems documentation by hand would be nearly impossible," according to Client Services Supervisor, Jean-Louis Legrand.

ASC produces new documentation in minutes

Mr. Legrand recently helped Mobil Oil install ADR's Automated System Charter (ASC) as a primary tool for computerized documentation maintenance. By using ASC, Mobil has gained many advantages including the establishment of new and simpler standards for programmers. Each time there is a system change, the programmer describes the change on a form submitted through one of Mobil's Client Coordinators for entry into ASC. This results in an automatic documentation update which can be sent throughout the DP Department by printing out a completely new report, produced at only a fraction of the former cost. Reports which would have taken up to 4 days to organize and type manually are now produced in a few minutes — automatically, through ASC.

ASC lets Mobil run systems faster

ASC gives Mobil's Client Coordinator a comprehensive, uniform, and up-to-date tool containing all the instructions he needs to run a system. Because ASC automatically standardizes documentation, the Client Coordinator understands a system faster and can run even a new system after only a few hours of study.

"An important aspect of the ASC document is that it now contains a very clear definition of all the reports coming out of a system along with detailed instructions on how they are to be distributed," Mr. Legrand added.

Improved backup is important

ASC has enabled Mobil to record all system documentation on one tape, with JCL in one library and descriptive comments in another. By dumping these two libraries, Mobil has full backup of all or any part of their documentation. Any report can be reproduced in just a few minutes.

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"With ASC, being up-to-date is almost automatic. When changes recur, ASC gives our Client Coordinators the ability to quickly make a copy of the complete, updated document so that everyone can work with the latest information," said Mr. Legrand.

ASC improves system chart quality, cuts costs

"ASC has let us document a system in about half the man-hours we would have normally used. And we have the advantage that the results are more uniform and complete. We do not miss steps as we might in a manual report, and the system chart and program steps are always printed in the same way," Mr. Legrand concluded.

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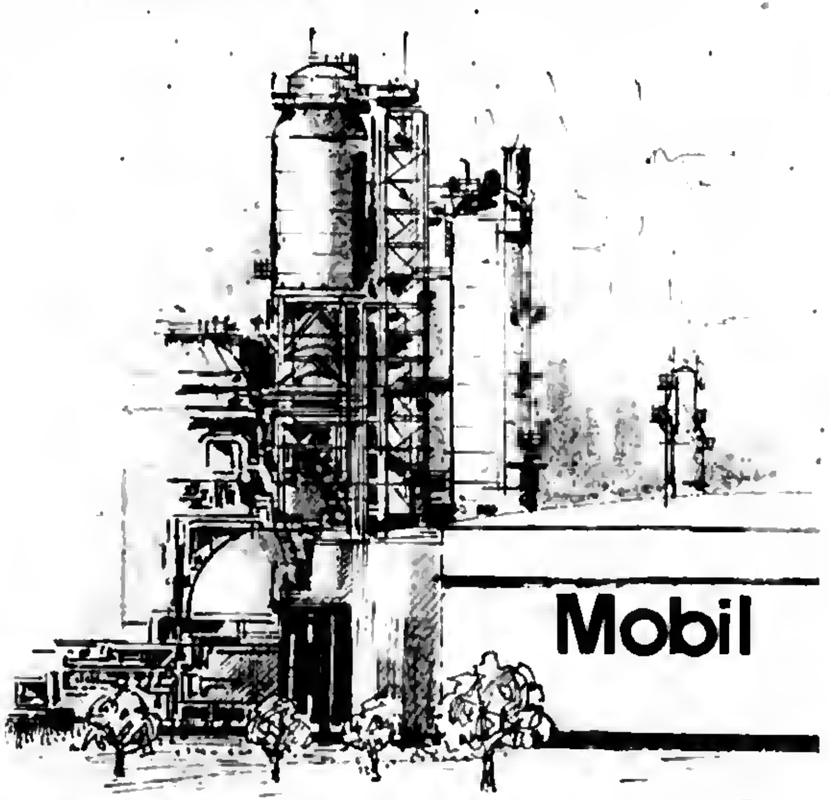

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Economist McAdams Has No Doubts: IBM Is a Monopoly

By Edith Holmes
Of the CW Staff

NEW YORK — IBM has monopoly power in the general-purpose digital computer system line of commerce — the corporation not only possesses the power to control prices in this market; it also has the power to exclude competition, according to Dr. Alan K. McAdams, chief economist on the U.S. government's trial team in its antitrust suit against IBM.

McAdams based his conclusions on the trial record and some 20 years of study of the computer industry throughout his graduate work at Stanford University's School of Business and now at Cornell University.

McAdams first became involved in U.S. vs. IBM in September 1971 when, as a senior staff economist with the President's Council of Economic Advisors, he was asked to determine whether there was any economic merit to the Justice Department's then-pending suit against the corporation.

Now on the stand as the government's summary witness with the task of tying together testimony and documents contained in the trial record, now over two years old and more than 53,000 pages long, McAdams said those companies that have been moderately successful in business DP have had to find "niches" in the marketplace where they could compete unperturbing to and therefore undisturbed by IBM.

Attempting a "formal assault" on IBM with a full line of equipment and services has not worked, McAdams said, citing IBM internal studies already in evidence.

Of the other mainframers in existence today, Honeywell is the only company that has successfully entered the business DP industry since the advent of computer technology without the benefit of a prior user base in products like accounting machines and tabulating equipment, he said.

Firms like Control Data Corp. and Digital Equipment Corp., for example, have won user acceptance in the scientific marketplace but have not done overwhelmingly well in marketing their machines for business applications, he contended.

'Opportunities to Fail'

To compete in business DP, a firm must market a combination of hardware, software, maintenance and service. This combination, in turn, must be capable of running a broad range of commercial applications, McAdams explained.

The firm must be prepared to lease its systems if it is to be an effective competitor in the marketplace. In addition, it must offer the user at least a promise of a compatible family of systems, the economist who helped government attorneys write the Justice Department's trial brief said.

"The industry offers multiple opportunities to fail," McAdams stated, referencing the testimony of executives from those firms which have exited from the business — notably General Electric (GE), RCA and Xerox. GE's and RCA's respective "full line approaches" and their failure indicates the wisdom of the niche market philosophy, McAdams suggested.

"If a market is truly competitive, both entry and exit are easy," the economist told Judge David N. Edelstein. The resources that GE, RCA, Xerox and Singer invested in the industry and the losses with which they left it suggest substantial barriers to entry, he contended.

All the measures that can be used to determine barriers to entry are indirect, McAdams cautioned. Among them, however, is IBM's own financial status.

IBM profits in the 1971-72 timeframe, the period most closely reviewed by McAdams, were unusually high compared with the rest of the economy and unusually stable, he said.

In addition, in 1976 IBM had a cash "hoard" of $6.1 billion and operating assets amounting to an annual return to cash flow of 50 cents on the dollar, McAdams testified.

Further, IBM uses conservative accounting practices and one of the most rapid forms of depreciation possible, he added, which helps to mask its true profitability.

Evolving Definition

Turning to the definition of "computer system" and how it has changed over the years as technology has evolved, McAdams told the court that between 1960 and 1965 it was possible for a firm to be an effective competitor by offering a single system of the small, medium and large varieties.

Systems in each size category did not have to be compatible then and rudimentary operating systems were considered useful but not required, he recalled.

Burroughs' work between 1965 and 1970 on its B5000 Master Control Program and IBM's promises for its 360 series announcement in 1964 made reasonably comprehensive operating systems and a family of software-compatible systems essential, according to McAdams.

From 1970 through today, this evolution of what constitutes a system has continued. Today manufacturers promise users that their systems operating software can handle various modes — batch, on-line, timesharing — simultaneously, he said.

Again citing IBM internal documents, McAdams stated that IBM announced the 360 prior to the time it conformed to IBM test procedures for announcement of a new product. The software for the family of compatible computers — OS/360 — hadn't even been specified when the announcement was made in April 1964.

IBM's actions in producing and marketing several members of the 360 family — particularly the 360/44, the 360/67 and the 360/90 — represented the corporation's efforts to create and defend its market share in the medium-scale scientific, time-sharing and prestige scientific markets respectively, according to McAdams. IBM's major motivation was not service to users, but the prevention of competitive inroads in these markets, he said.

With a performance in the range of the 360/50 and a price approximating that of the 360/30, the Model 44 was intended by IBM to blunt CDC's success in the medium-scale scientific market, for example, McAdams testified.

Not wishing to provide all its users with the price/performance ratio it offered this segment of the scientific marketplace, IBM designed the Model 44 to be incompatible with the rest of the 360 line so the machine would not attract the corporation's commercial or business DP users, the economist stated.

In addition, the 40 and 50 were high-profit machines, producing about 30% profit on revenue before taxes, while the 44 was planned to be very close to the break-even point, McAdams said. And the 44 cost IBM something to produce — with production facilities tight, every 44 made meant one less 40 or 50, he added.

Anti-Lessor Strategy

IBM treated its leasing company competition in a similar manner, changing the purchase/lease ratio on its 370 line to discourage the growth of leasing firms which bought up 360 CPUs and leased them to users for better-than-IBM prices, McAdams said.

IBM promoted the concept of risk leasing or rental of general-purpose computer systems and opposed an encroachment on that market by independent leasing companies because the system allowed IBM to retain "complete control of its property," he added.

"The viability of IBM's risk lease is dependent on price leadership and price control . . . by means of price leadership, IBM has established the value of DP usage," an internal IBM document written in November 1969 and used during McAdams' testimony said.

By retaining control over its machines which were out on lease, IBM could also maintain the value of DP usage, McAdams indicated. It controlled that value by such acts as "timing of new technology insertions; functional pricing; coordinated management of delivery; support services and inventory; refusal to market surplus used equipment; refusal to discount for age or for quantity; strategic location of function in boxes; 'solution selling' rather than hardware selling; [and] refusal to support subsequent use hardware," the IBM document said.

Leasing companies rose during the late '60s and, although they were in a sense still customers of IBM because they purchased systems, the manufacturer saw them as "insidious" because they reduced the number of rental customers available to IBM, a second IBM document said.

The average system life was extended by leasing companies because they kept a system out on lease longer than IBM would have offered it, which reduced activity in the market, McAdams said.

"IBM's ability to extract profit no matter where the customer moved was influenced," he added.

Effect of 370

Leasing company activity was strongest with the 360/65 and 50. When IBM announced its 370 series line in June 1970 (a year earlier than expected), the majority of equipment in the leasing company portfolios was obsoleted, McAdams said.

The 370 announcement was specifically made with "clear impact on competing firms," which included leasing companies, he testified.

McAdams referenced a Fortune magazine interview of several IBM executives at the time of the 370 announcement which quoted Thomas J. Watson, then chairman of the IBM board, as saying that most of the corporation's troubles in the marketplace were caused by leasing companies rather than the recession going on at that time.

The 370 was an undesirable market for leasing companies because it had a "significantly higher" purchase-to-lease multiplier and higher maintenance charges, which made operating leases undesirable to third-party lessors, McAdams said. The 370 also offered better price for performance to users by having faster peripherals and a larger memory capacity which were unavailable on the 360, he noted.

Leasing companies attempted to compete by increasing the capabilities of the 360 to equal that of the 370, he said. They found it was feasible to go beyond the "arbitrary" limits IBM had set on add-on memory for the 360, he added.

IBM, however, refused to maintain its systems that had memory over the limits it had prescribed which made a negative impression on potential users, he added.

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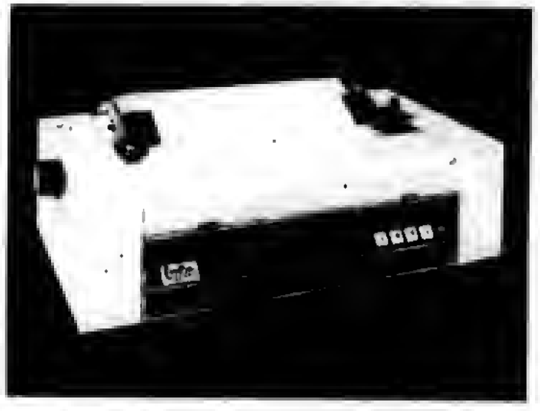

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Study Extraction Feasibility Methods

Minis Help Researchers Get Oil From Wyoming Shale

By John P. Hebert
Of the CW Staff

LARAMIE, Wyo. — Minicomputers are helping researchers here to develop methods of exploiting a virtually untapped energy resource: underground oil shale deposits.

Engineers and research scientists at the Laramie Energy Research Center (Lerc) here employed minicomputers as data collection devices last year in one of the first experiments to determine oil shale extraction feasibility methods.

The experiments, sponsored by the Energy Research and Development Administration (Erda), were aimed at finding ways to extract about 1.2 trillion barrels, or 50.4 trillion gallons, of the approximately 1.8 trillion barrels of oil believed to be in the shale in the Green River Formation of Colorado, Wyoming and Utah. Using conventional underground mining techniques only about 600 billion barrels of oil — or 21.3 gallons per ton — could be squeezed from the shale, according to Bruce Sudduth, project engineer for last year's Rock Springs Site 9 Retorting Experiment.

The Site 9 project concentrated on pumping a small part of the vast reserves in the Green River Formation that cannot be retrieved using the conventional "pillar" mining, Sudduth explained.

In some ways, Lerc failed in its efforts, Sudduth said. "The experiment was not very successful in terms of pumping large amounts of oil out of the ground. Out of a possible 2,000 barrels of oil, we recovered only 70 or 80 barrels," he said.

One of the main problems is that Lerc engineers were dealing with an unknown.

"We honestly don't know how to write good algorithms for this application . . . because we just don't know the composition of the resources," he said.

General Understanding

However, the experiment was successful in helping to determine how minicomputers can be better utilized as data collection devices in future retorting experiments, Sudduth said, and it also added to the general understanding of complex and unobservable underground conditions and reactions.

The Site 9 field experiment 200 miles northwest of Lerc headquarters entailed underground combustion (retorting) of the natural oil shale deposits and collection of product oil and fuel gases.

The project relied on a Hewlett-Packard Co. 9600 data acquisition and measurement system for temperature and pressure data acquisition and storage, real-time monitoring of certain experimental aspects, control of gas chromatographs, mathematical formulae computation and periodic summary outputs.

The 9600 was connected by cables to a 32K HP 2100 minicomputer located in a trailer adjacent to the well field. The 2100 system included an HP 7900 disk drive with 9.5M bytes of storage, an HP 7970 magnetic tape drive, paper tape reader and punch, HP systems for analog to digital conversion, and a crossbar scanner for multiplexing signals.

Computer Contributions

"One key advantage of the minicomputer systems was their capability to pull all the data in and store it on disk files for later analysis, at the field experiment site," Sudduth said.

Another important contribution of computer technology was evident during the ignition phase. The real-time capability of the system to monitor temperatures helped Lerc engineers to control power to a downhole electric heater and prevent heater damage, according to Sudduth.

Site 9 consisted of a center well used for initial ignition and afterwards for injection of air to sustain the underground combustion, four surrounding wells; four other production wells; and four observation wells drilled inside the test area, containing thermocouples at five levels down.

Each production well from the inner square was paired with one from the surrounding wells. The oil and gas outputs from the two were combined to feed a single demisting tower that removed oil mist from existing gases.

Lift pumps were used to pump oil from each production well. The main production well is a vertical shaft, 8-1/2 ft. in diameter. Air is injected and recycled in a process of spontaneous combustion to burn the carbons and retort the shale.

Gases Analyzed

An instrument room nearby was equipped with an HP 5830 gas chromatograph (GC) that was used to analyze gas samples piped from each production well pair.

Every 16 hours, bottled standard gas was fed to the GC for calibration purposes. The 2100 minicomputer controlled the injection of the samples, closure of the valves and collection of the GC voltage data.

The amounts of the various gaseous constituents were calculated for use in energy balance calculations to follow the progress of the underground reactions.

The instrument room also contained the manual backup system for the computer, which consisted of an array of strip chart recorders that read and plotted most of the temperatures and pressures as well as HP 2615 terminal and line printer.

An in-house-designed user program called Rascal assured that the minicomputer was easy to use while preventing users from "getting into the operating system and causing damage," an engineer explained.

Rascal, for example, made it easy for users to select an hourly summary for review interactively.

According to Mark Cunningham, DP specialist for Lerc, the HP system was used in this particular experiment because many of the project engineers are generally more familiar and experienced with it and also because HP offers real-time software packages that are easy to interface with user-developed programs.

The disk-based RTE-II system permits support of many different instrument and peripheral systems for real-time measurement, control and reporting. Multiprogramming capability allows users to develop programs and execute them at the same time that real-time data acquisition and processing is taking place, he said.

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Justice Revokes Go-Ahead for FBI Message Switching

(Continued from Page 1)

Flaherty to FBI Director Clarence M. Kelley that said, "we are thoroughly reviewing the subject of message switching in the Department of Justice in cooperation with members of Congress to determine whether the FBI should be permitted to engage in message switching and, if so, what guidelines should be administered to protect the public."

Retilling Same Ground

In the meantime, Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights is reported to be driving toward some resolution of the message-switching problem, with hearings anticipated soon.

The subcommittee is trying to construct models of how the FBI's National Crime Information Center (NCIC) communications system now works, how it could work with added message-switching capabilities and how such a system could work outside of the aegis of the Federal government, a staff member said, acknowledging all this ground has been tilled before with expensive studies funded by the Law Enforcement Assistance Administration.

However, things may be different now. The Privacy Protection Study Commission, in its report due tomorrow or in its follow-up report due in September, will include the results of its investigation of the nation's criminal justice system. Those results will show the FBI and other federal law enforcement agencies are "pretty much unregulated," a source said.

This time, when Congress resumes efforts to draft legislation that would cover how criminal records may be used and how these agencies' activities should be limited to assure individual Constitutional rights, there will be some hard data that didn't exist before, the staffer predicted.

Edwards is also reportedly concerned that many states are influenced by the fact that the FBI message-switching service, like its fingerprint identification service, would be provided to the states as a "free service."

On the other hand, services from the National Law Enforcement Telecommunications System (Nlets), a nonprofit consortium operated by the states, come out of state law enforcement budgets. Certainly, the services provided by the FBI are no more free than those furnished by Nlets — they all come out of tax dollars, although the FBI doesn't like to hear people say that, a source remarked.

In its request for a go-ahead on message switching, the FBI attempted to separate the NCIC's Computerized Criminal History (CCH) records from the stolen property and warrants system and handle the non-CCH aspect first, even though the same technology would allow them to do both.

Some people on Capitol Hill are buying that argument, a source said. Some perceive message switching merely as a service function for state and local law enforcement much like fingerprint identification, and "there's no reason why the FBI or some neutral entity shouldn't have that function."

As the turmoil over message switching was beginning to quiet down, a two-day briefing was hosted by Chairman Edwards to acquaint new House members and staff with the law enforcement and computer jargon that surround the issues of message switching, computerized criminal histories and the like.

Deputy Attorney General Flaherty, in a mood of conciliation, attended the briefing along with representatives of the FBI, Nlets, the Justice Department Telecommunications Committee and representatives of criminal justice systems in California, Illinois and Florida.

Carter Administration Plans Federal DP Revamp

(Continued from Page 1)

quist asked for responses by July 15, "that obviously is not a hard-and-fast deadline," an agency spokesman acknowledged.

To stimulate participation, Granquist included with his letter a list of "previously identified" issues and problems as a guide to what he thinks are the project's basic concerns. But he noted the list "is by no means all-inclusive, so use or ignore [it] as you deem appropriate."

The list was, in fact, so general it suggested to some recipients that OMB has little idea what direction it should follow. Covering some 30 items, the list started with "data processing planning process" and "requirements planning," included "convergence of data processing and telecommunications" and ended with "functional performance specifications policy, Software Exchange Program, etc."

Quick Action Planned

While the study is intended to be broad in scope, it will be structured in a fashion that will permit pieces to be spun off and acted upon throughout the project, Granquist said. Some "high-priority problems, such as computer security policy and improved DP planning," are already being addressed in this way, he added.

As others are identified, "they will be given immediate attention. Throughout this project our goal will be to identify a problem or set of issues and create a task force to address them.

"As soon as each task force presents its recommendations — there will be strict deadlines for all groups — that group will be disbanded and implementation of its recommendations initiated," he continued.

Although the stimulus for setting up the task forces will come from the outside comments, membership of the task forces will be drawn largely from within OMB, the agency spokesman said.

Granquist expects the full study and initial implementation of its recommendations to be complete in 10 to 12 months, but one informed DP professional within the government called that estimate "at least optimistic" if the study's work is to be effective and substantial.

Even though he believes Granquist would be unable to get a lot done in a limited timeframe, the observer feels certain the effort to gain better control over the sprawling federal DP facilities is "a serious one and agencies better be ready for changes."

While the OMB spokesman admitted he had not spoken to Granquist specifically about the timetable, he said he was sure it was the project director's best estimate of the time needed to accomplish the work of the project as he currently envisions it.

Comments about the project can be addressed to Granquist at OMB in the Executive Office Building, Washington, D.C. 20503.

Monitors Check Jet Noise Level

(Continued from Page 1)

sing dogs.

Using the data provided, airport investigators can determine what contribution aircraft are making to the overall noise level in a surrounding area.

The first system was installed in 1973 at the San Diego airport in accordance with a law passed by the state of California requiring noise monitoring at all airports. Airports outside California have installed them on a voluntary basis.

Although a state cannot penalize an airline or individual pilot for exceeding certain state-established noise levels, it can prescribe certain long-range guidelines.

Airports, in turn, are becoming more sensitive to the problem and increasingly have been changing flight plans and landing and take-off procedures to alleviate as much noise as possible.

Monitoring Equipment

The noise monitoring system uses remote microphone installations linked to a Varian Data Machines V71 minicomputer to perform calculations for a noise index. The index is continually being recorded, processed and compared with previous results, according to Varian officials.

The index is used by airport investigators to analyze cost-effectiveness of noise relief programs such as the two-segment landing approach. In this approach, the landing aircraft descends from a six-degree to a three-degree glide instead of a steady three-degree approach, according to a spokesman. In this way, the plane is able to fly higher and more quietly over residential areas near the airport.

The noise monitoring system has proven "very reliable," according to Walter Collins, noise abatement officer for both the Los Angeles and Ontario airports.

Right now, the purpose of the system is not to use it as a tool for change, but only to identify certain levels of noise in order to establish impact areas, he said.

This year, the Los Angeles airport was told it was exceeding the criteria established by state law, so airport officials are trying to find different traffic patterns and other measures to reduce the noise.

However, "solutions are not always reachable economically," Collins said. While demands for noise reduction have increased, the standard of service demanded by the public has not decreased and a compromise can't always be reached, he added.

The noise-monitoring computer distinguishes between aircraft noise and other community noise by means of tracking and screening programs written by the EG&G Hydrospace-Challenger Group of San Diego. The programs take into account such factors as sound duration and the shape of the sound, meaning how it builds up and falls off. It also monitors the route of sound from each remote monitoring substation to the next.

Two separate noise-level tallies are kept by the computer. One is an account of the aircraft average noise level and the other is for the community average noise level, which includes all other noise.

The computer produces the noise-level averages for the community and the aircraft every hour at every site. In addition, daily, weekly and monthly noise-level totals are made. These figures have indicated that evening noise is more noticeable and annoying than noise at any other time. In addition, take-off sounds last longer than the noise from landings.

Individual aircraft can be identified by recordings of the actual noise picked up at a site and run through the system along with the tower-to-aircraft conversations identifying the flight number.

Remote monitoring system (RMS) operators may also listen to specific sites using a separate telephone line.

Fifty-four monitoring systems are used to perform data acquisition and processing, visual and audio display, identification of unusually loud noises from individual aircraft and data printout.

These RMS have weather-proof ceramic microphones mounted on specially designed poles and can communicate with the minicomputer, located at the airport by leased phone lines.

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Pacesetter for Europe?

Danes Get Privacy Bills Considered Mild

By G. Russell Pipe
Special to Computerworld

COPENHAGEN, Denmark — The Danish parliament is considering two bills to provide privacy protection for individually identifiable data. These regulations are the most limited privacy measures introduced so far in Europe.

Six years in preparation, one bill covers the private sector and the other, the public sector.

These government-sponsored proposals represent a significant departure from the Swedish, German and other European privacy proposals for a number of reasons.

First, the proposals outline different treatment for government and private industry. Second, the proposed regulatory commission is relatively weak compared with its European counterparts. Third, registration of systems rather than licensing has been proposed — but only in the private sector, and then sparingly for those organizations using personal records for management purposes.

Finally, the right of individuals to access their own files — a key feature of most European privacy measures and a key objective in international efforts to standardize privacy laws — is not a blanket requirement for Denmark's private sector.

Data Registration Board

Under the government-proposed scheme, a seven-member data registration board (DRB) with supporting staff would be created as an autonomous unit within the Ministry of Justice, to be appointed by the Minister.

Privacy rules for public agencies would pertain only to computerized systems and would govern maintenance, access and use of such records.

Under this design, the national government's privacy obligations would be essentially unsupervised except for a review of complaints and disputes by the Minister of Finance.

In the private sector, on the other hand, registration and supervision would be under the DRB's jurisdiction. Here, both computerized and manual files would be covered. However, scientific, statistical and archival data relating to individuals would be exempt.

Sensitive Data

Registration of personal data would not be necessary if it is "natural" or normal to the conduct of an organization's activities. That is, firms may maintain files on employees, clients and other individuals if they are essential to their internal operations and kept within the organization.

But files containing "sensitive" information such as race, religion, politics, sexual practices, health, criminal record, drug or alcoholic treatment must be registered. Personal information to be transferred between separate, unrelated organizations must be reported, and information older than five years may not be linked to other information, unless specifically approved.

No overall security requirements are outlined in either measure.

All data processing service bureaus — large and small — would be required to register with the DRB.

Direct mail services would be restricted to maintaining only the name, address, occupation and basic public record types of information about individuals. Sensitive characteristics would not be permitted to be recorded.

Local governments as well as private organizations would come under the DRB's jurisdiction. In the case of disputed decisions, the Minister of Finance would be empowered to resolve those brought by local governments. However, private organizations would have no appeal.

Board permission would be needed to transfer personal data outside Denmark. Government agencies may be granted one-time or case-by-case permission depending on the purposes to be served, according to the proposal.

Businesses registering their systems to comply with other provisions of the statute would have to ask pemission to export personal data. This would be mandatory for sensitive data or when information is given to third parties.

There may be several reasons why the Danes are approaching privacy with much more reserve than did their Swedish neighbors, not the least of which is lack of public demand for the legislation.

Civil servants here have long enjoyed public confidence and are reluctant to impose rules implying lax procedures may exist. But since private enterprises are much more independent and less subject to regulation than in Sweden, separate public/private approaches were logical.

Because the present government faces a parliament which may seize on issues of cost and is generally antibureauracy, it was felt that an essential minimum, and no more, should be proposed.

Denmark is a member of a score of international organizations which may deal with the harmonization or regulation of privacy/security/data movement issues.

Since Denmark is the only country to belong to all of them, whatever norms are established in Denmark may form the basis for negotiations among other countries.

The fact that Denmark has strayed so far from the scope of regulation in the other European countries in the modest authority invested in its DRB may make harmonizing the laws among the nations a more difficult task, especially for the Council of Europe.

'New Weapon'

STOCKHOLM — "One thousand data processing operators would be enough to close down most trade, industry and government activities in Sweden," the *Dagens Nyheter* (Daily News) of Stockholm declared in banner headlines recently.

There are currently more than 3,000 DP programmers and operating personnel in Sweden, nearly all of whom are members of a single trade union. When a nationwide white-collar strike threatened in April, officials were warned by union representatives: "We are aware of this new weapon against employers."

The fact that most large companies and government agencies have automated major administrative files makes them increasingly dependent on computer personnel, *Dagens Nyheter* reported.

"Even absences over summer holidays could endanger reliable DP," it said.

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Cbema, ASQC Join Forces Opposing S. 825

By Molly Upton
Of the CW Staff

The Computer and Business Equipment Manufacturers' Association (Cbema) and the American Society for Quality Control (ASQC) have joined the opposition to S. 825, the Voluntary Standards and Accreditation Act of 1977 (see story on Page 9).

Both decry the mandatory aspects of standards which the proposed National Standards Management Board (NSMB) would bring in replacing the voluntary aspects of the American National Standards Institute (Ansi).

The ASQC focused on the overlapping authority between various government agencies and predicted resultant confusion. The two opponents are secretariats of Ansi.

Cbema labeled the bill "premature and unwarranted," contending the "overall voluntary system of this country has operated successfully for over 75 years and is the basis on which the success of our industrial community has been built."

The ASQC claimed the bill would "replace the existing widely accepted Ansi system with an unknown, expensive, untried organization in federal government to perform identical duties."

S. 825 proposes a "confusing overlap of responsibilities" among the Federal Trade Commission, National Bureau of Standards (NBS) and the proposed NSMB, the ASQC noted.

The overlap "portends bureaucratic delay and mismanagement," according to the ASQC, which is a secretariat for Ansi's Z-1 committee on quality assurance.

ASQC's "experience in dealing with various federal agencies and departments would indicate a dismal future for such overlap in responsibility" as outlined in the bill.

In a letter to Sen. Edward M. Kennedy (D-Mass.), chairman of the Antitrust and Monopoly Subcommittee, and to members of the Senate Judiciary Committee, the ASQC outlined the three reasons it opposes the legislation.

"The present voluntary consensus standards system works as a fair and equitable arena for commercial product and service standards," according to the letter. "Any necessary improvements do not warrant and can be made without additional federal legislation."

Although S. 825 borrows many good provisions from the existing standards system, it offers "no new ideas toward the expeditious management of voluntary consensus standards," the ASQC continued.

The bill does offer federal dollars and a commitment to greater government participation — but "at a cost three times the annual budget of the existing private-sector system it would replace."

The association said "the private free enterprise system on which our country was founded will not long support a standards development system in which [the private sector has] practically no role in its rulemaking or management processes."

A better approach to federal involvement in standards is contained in the proposed Office of Management and Budget circular which encourages wide usage of voluntary standards by all federal agencies, the ASQC indicated.

For its part, Cbema observed in a statement that "the test of proper legislation is whether reasonable and enforceable safeguards are introduced in the standards-setting process without imposing excessive federal regulation."

Cbema is the secretariat for Ansi's X3 committee on computers and information processing and X4 committee on office machines and supplies.

"We think that S. 825 fails this test. Any modification of the standards program should ensure that there is no impediment to ingenuity and the development and implementation of new technology for industrial products" and "there is no ban to the free market choice of the consumer for any product."

Calendar

Aug. 2-5, University of Waterloo, Waterloo, Ont. — **Third International Conference on Computing in the Humanities,** sponsored by the University of Montreal and the University of Waterloo. Contact: Prof. J.S. North, Department of English, University of Waterloo, Waterloo, Ont., Canada N2L 3G1.

Aug. 3-5, Boston. — **Conference for DP Trainers,** sponsored by Ware Associates. Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

Aug. 4-6, Boston — **Personal Computing Fair,** sponsored by Boston University Summer Term. Contact: Jack Star, Personal Computing Fair, Boston University Summer Term, 725 Commonwealth Ave., Boston, Mass. 02215.

Aug. 7-11, Kansas City, Mo. — **15th Conference of the Urban and Regional Information Systems Association (Urisa).** Contact: Dr. Barry Wellar, Ministry of State for Urban Affairs, CMHC Buildings, Ottawa, Canada K1A 0P6.

Aug. 8-12, Toronto — **International Federation for Information Processing (Ifip) Congress 77.** Contact; Ifip Congress 77, C/O The Bowery Savings Bank, 110 E. 42nd St., New York, N.Y. 10017.

Aug. 8-10, Oklahoma City, Okla. — **Ninth Annual Meeting of the National Association for State Information Systems (Nasis).** Contact: Judie Parish, Administrative Assistant, Nasis, P.O. Box 11910, Lexington, Ky., 40511.

Aug. 10-12, San Francisco — **Institute for Software Engineering First National Conference.** Contact: Edward L. Prichard, Director, DP Authority, City of Portland-Multnomah County, 4747 E. Burnside, Portland, Ore. 97213.

Aug. 22-26, Boulder, Colo. — **Time and Frequency: Standards, Measurement, Usage,** sponsored by the National Bureau of Standards (NBS) Contact: Jeannette Detter, 277.06, NBS, Boulder, Colo. 80302.

Aug. 22-25, Cambridge, Mass. — **Fifth International Joint Conference on Artificial Intelligence.** Contact: Prof. Edward Fredkin, Local Arrangements Chairman, 545 Technology Sq., Cambridge, Mass. 02138.

Aug. 23-26, Bellaire, Mich. — **Parallel/-Distributed Conference** cosponsored by the IEEE Computer Society and the Department of Electrical and Computer Engineering at Wayne State University. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

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As Part of NBS

Bill Would Create Federal Standards-Making Institute

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – A Senate bill that would create an independent government-financed standards board and a new Institute of Standards and Accreditation in the National Bureau of Standards (NBS) received strong support from the Computer & Communications Industry Association (CCIA) during hearings here recently.

However, equally strong opposition to the Voluntary Standards and Accreditation Act of 1977, S. 825, was lodged by the American National Standards Institute (Ansi).

The lack of computer industry standards costs the taxpayer "hundreds of millions of wasted dollars per year," CCIA President A.G.W. Biddle told the Senate Antitrust and Monopoly Subcommittee, chaired by the bill's author, Sen. James Abourezk (D.-S.Dak.).

Testifying on behalf of Ansi, the organization's executive vice-president, Donald I. Peyton, argued the bill would deprive the American public of the voluntary standards system by nationalizing it.

Ansi views the creation of the National Standards Management Board and the new NBS institute as its obvious replacement as the national standards-setter, Peyton said.

Rather than take the standards efforts in-house, the government should fairly enforce existing laws "which are totally adequate to provide oversight for voluntary activity," Peyton stated. Congress should encourage and support government participation in voluntary standards activities and government use of those voluntary standards which meet its needs, he added.

More FTC Responsibility

Besides establishing a standards board and an accreditation institute, the Abourezk bill would strengthen the Federal Trade Commission's (FTC) responsibility to see that standards are not used as anticompetitive tactics. This would be accomplished by providing a means of appealing FTC decisions where appropriate, a spokesman for the Senate subcommittee explained.

The Secretary of Commerce would be given overall responsibility for standards efforts. Through the proposed NBS institute, the Commerce Department could check out laboratories who come to it and ask to be accredited to test products for consumers and the government.

One of the assumptions of the bill is that testing facilities like Underwriters' Laboratories have become "the tools of the industries," he noted.

The NBS institute could develop standards in the absence of private initiatives, according to S. 825.

The bill further provides for U.S. government participation in international standards efforts.

Change of Heart

Jordan Baruch, assistant secretary for science and technology at the Department of Commerce, appeared briefly before the subcommittee to present executive branch opposition to the bill.

Abourezk, who had been informed by high-level Commerce Department officials that Baruch and the department as a whole supported S. 825, asked Baruch why his stance had changed. Staff members indicated the change was made on orders from the Office of Management and Budget (OMB).

Abourezk, who wanted to know Baruch's personal opinion about the bill, asked that he provide it, and Baruch said he would ask the White House for permission to do so.

Last week a subcommittee staff member indicated Baruch had provided his "qualified" approval of the bill without indicating why OMB had asked that he oppose it.

During the hearings, the CCIA's Biddle explained to subcommittee members that the lack of compatibility between mainframes makes it difficult for users to move easily from one manufacturer's system to another's.

There is no institutional mechanism to encourage voluntary private-sector standards bodies to act in any but their own self-interest, Biddle said, citing Ansi X-3 committee contributions regarding a standard to permit the interconnection of peripheral products to mainframes as an example.

The Computer and Business Equipment Manufacturers Association (Cbema) has served as the secretariat of Ansi X-3 for several years, and IBM is a key Cbema member, Biddle said in explaining the industry leader's potential for influencing any standards-making process.

"A mechanism must be developed and implemented to prioritize the development of those standards that will be most beneficial to users and to the nation," Biddle said. "In our industry we have numerous standards dealing with how a magnetic tape reel should be labeled, or physically specified, as well as standard numerical designations for cities.

"We do not, however, have standard higher level computer languages that permit a program written for one manufacturer's machine to be run without change on another's machine," he said. "Nor do we have standards for the efficient high-speed usage of computer/communication networks or standards for the interconnection of the various units of hardware and software that go together to make a computer system.

The CCIA recommended Congress create a Computer & Communications Standards Board (CCSB), modeled after the Financial Accounting Standards Board (FASB), which would be under the full-time direction and control of a board of directors drawn from both the government and the private sector, including representatives from large and small providers and users.

The CCIA also proposed an addition to S. 825 which would require that standards be developed for the interconnection of devices made by different manufacturers.

When less computer equals more performance, small really is beautiful.

A special report on *Minicomputers and Small Systems* in the August 29th *Computerworld.*

Minis are now functioning at every level of business and industry, and *Computerworld's* August 29th special report, edited by Esther Surden, will focus on several issues that are currently the subject of widespread discussion and debate in the minicomputer field. We'll also cover minicomputer hardware in depth — including microcomputers being used in data processing systems. In all, you'll see a variety of applications stories and tutorials on topics like these:

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Contu Researcher Asks Help

How Effective Is Your Software Protection?

The National Commission on New Technological Uses of Copyrighted Works (Contu) was established to consider problems related to the reproduction and use of copyrighted works on DP systems, among other things. To do this, it has contracted with various research firms to gather data in specific areas of interest.

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Harbridge House developed the following questionnaire to accumulate statistics, rather than folklore, on what forms of protection are being used for software and how effective that protection is.

CW has been assured (by Harbridge House) that information provided by readers will be treated as confidential, not going forward in the company's report to Contu nor in a summary report of the results with which the researchers will provide CW.

The completed questionnaire should be sent to Richard I. Miller, Harbridge House, Inc., 11 Arlington St., Boston, Mass. 02116.

Contu Questionnaire

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5. How much does your company invest annually in software development and research? $________

6. Please indicate below how often during the past year you utilized the following forms of software protection, and indicate how effective you consider them to be. (If you do not know, please indicate with "DK".)

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c. State trade secret law			
d. Release of object program only			
e. None of the above			
2. Requirement for "know-how"			
3. Use of cryptographic protection			
4. Use of other means to limit access to the software program.			

*0 = not effective at all; 5 = completely effective.

7. Please list the proprietary software products you market below and indicate next to each whether there is no significance, some or great significance regarding the importance of legal protection for each of the products.

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________

8. Have you ever rejected or abandoned a marketing program for a proprietary software product because of the inadequacy of legal protection?

Yes ________ No ________

9. Do you know of any situation where software products representing a significant level of innovation are not developed or marketed because of inadequate protection?

Yes ______ No ______ Please Identify ____________________

____

____

____

____

10. Do you contemplate any change in your marketing program because of the Copyright Act of 1976, effective January 1, 1978? Yes ______ No ______

11. How would you change your marketing program if legal protection were otherwise improved for computer software? ____________________

____

____

____

Thank you for your participation.

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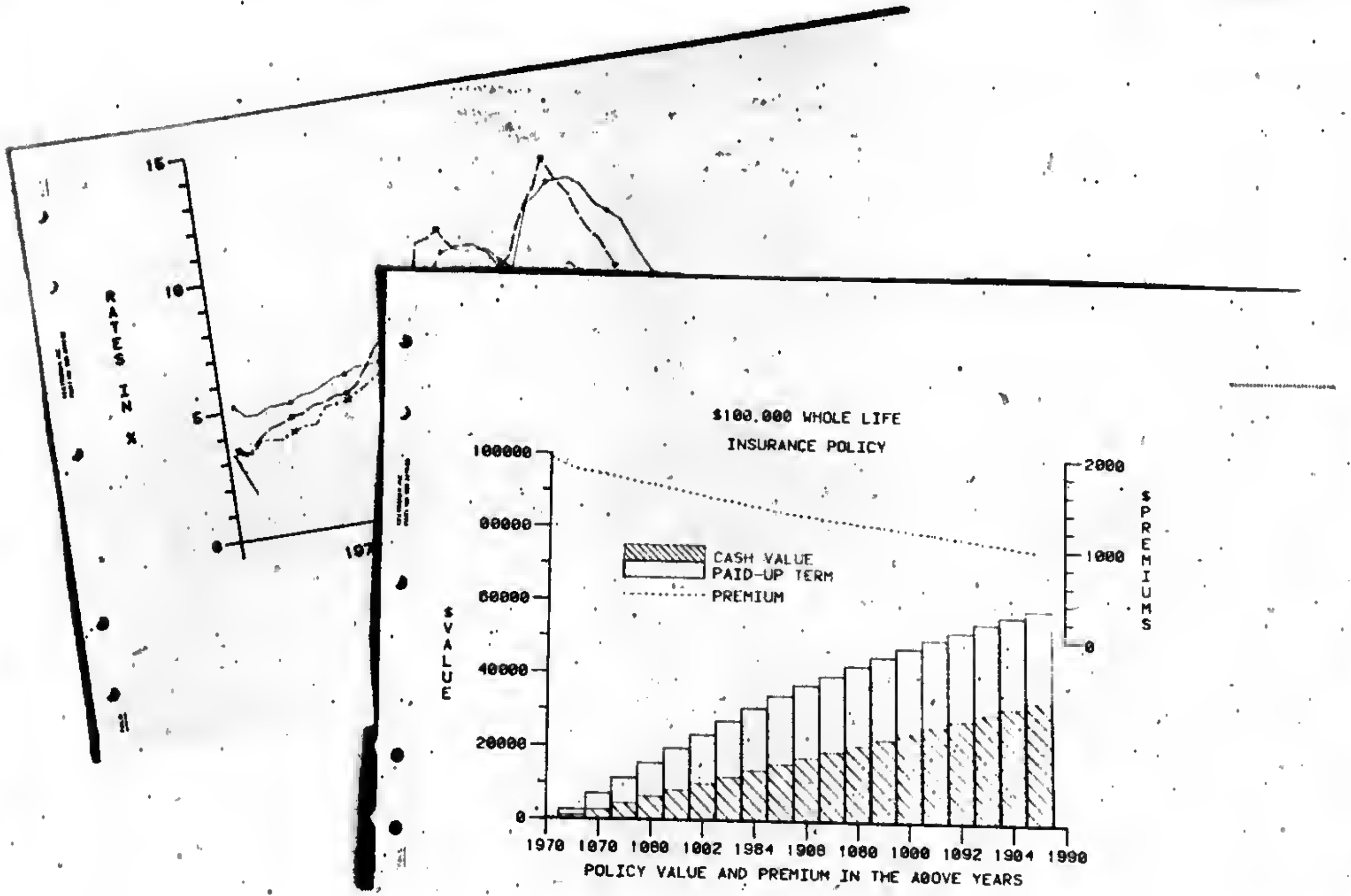

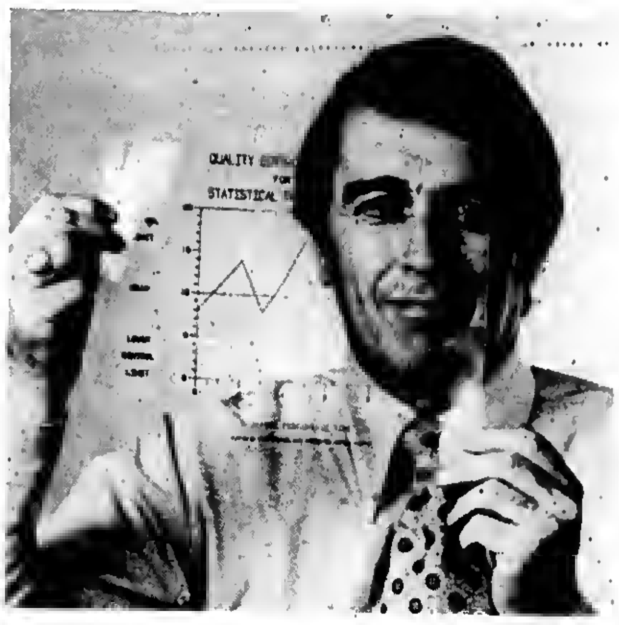

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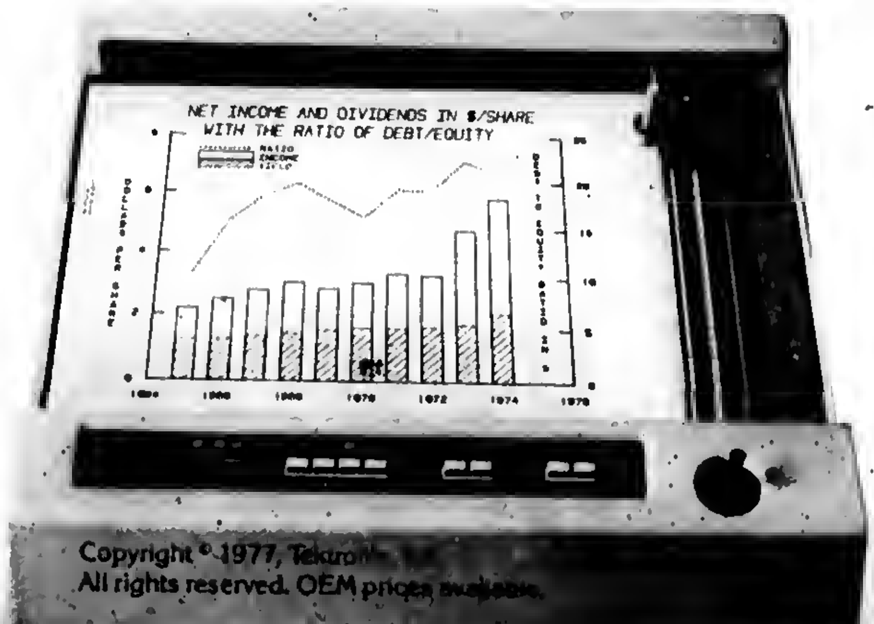
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DP Auditing Viewed as Art Form Instead of Science

By Frank Vaughan
Of the CW Staff

HOUSTON – Auditing a DP installation is not a science – it is an art form without a single "correct" plan and is subject to change and imagination, according to William A. Boss, vice-president of marketing support for Pansophic Systems, Inc.

Speaking at the Fifth Annual International Conference of the EDP Auditors Association here recently, Boss said there are six aspects of an installation that an audit must cover: procedures, controls; documentation, functions of the center, programs and data.

"Of primary concern to auditing is the assurance of auditor independence, no matter what type of audit is performed," he said, echoing the concerns of other conference speakers.

This has been a problem in the audit of the DP installation since auditors have been dependent upon the data center personnel to do most of their work because they do not understand the language of the data center personnel or the computer.

"Audit tools must be established for the auditor's use which provide the ability for him to directly interface with the computer easily, quickly, efficiently and independently," Boss said.

The amount of data in a DP installation is enormous, he noted. Before the introduction of the modern computer, data was maintained on pieces of paper in file drawers. Elaborate file structure systems were used to maintain this data in an orderly manner – which were quite easy to audit, he recalled. All the auditor had to do was find the paper and then do what was required.

Today, however, a great majority of the data is stored in computer files, on either magnetic tapes or disks. This creates a problem for the auditor since he cannot read or look at the data stored on computer files. The auditor now must use information retrieval software systems to extract the needed data from the computer files.

Types of Information

There are eight types of information generally required to perform an audit of the data on the computer files. They are:

- Summarization reports, which illustrate on a summary level the data that is maintained.
- Averages, which can illustrate trends.
- Selected reporting, which provides the auditor with only a selected portion of the data on a file.
- Confirmation notices, which are usually a part of accounts receivable or payable.
- Address or mailing labels, required so special mailings can be accomplished.
- Aging reports, for accounts receivable and for accounts payable in bad times, which are useful in determining delinquent accounts and customer paying trends.
- Stratification analyses, which allow an auditor to review data on a file from a stratified viewpoint.
- Balance analyses, somewhat like the stratification analyses, but which also include the cumulative percentage and a visual presentation of the stratification.

Exception Reporting

Exception reporting is a very necessary function for the auditor, Boss stated. Too often files contain bad data, duplicate data or missing data and the computer system or company is not aware of it until it is too late.

As a result, time is lost because of unnecessary reruns of the program once the file is corrected, or, even worse, reporting of critical data is invalid, he observed.

An audit should not only examine the data, but should verify the data on the files, he said. Invalid data and bad codes fall into many categories.

Points that should be examined should include some of the following questions: Are the codes proper? Are the dates on the file really in the calendar? Are amounts or quantities on the file reasonable? Is there duplicate or missing data?

"When I state that large differences in files should be checked, I mean two things. One is that certain items must have certain values, such as the hourly wage," he said. But he emphasized the need to note differences in figures over time. For example, wide variations in payroll or inventory figures should be questioned by the auditor, he said.

Software Could Ease Use of Lab Animals

ROCHESTER, N.Y. – A computer program designed to do initial toxicity screening on chemicals may reduce the need for costly experiments on laboratory animals.

Developed by Genesee Computer Center here, the program could be used as a first step in the testing process, according to the firm.

Relying solely on laboratory testing is a longer and more costly method, according to David Pixley, vice-president of Genesee. The Toxicity Prediction System screens out which compounds are most likely to be toxic, he explained.

"There is a much better likelihood of success if you do this before going to animal testing," he added. Many compounds can be eliminated in this way before investing in animal research.

Currently able to run on a Control Data Corp. 6000 or a Cyber system, the software is being tested at various locations but has not yet gone into full-scale usage, he said.

Primarily devised for testing new products before they are introduced to the consumer market, the program has accurately forecast toxic substances 95% of the time, Pixley said.

The data base consists of a combination of statistical patterns, chemical compound structures and known testing data, he said. In order to approve a different compound, statistical pattern recognition techniques are used to determine the toxicity, if any, of the new compound.

The program can produce an estimation of the amount needed for the tested compound to prove toxic to white rats, Pixley said. It is able to eliminate a number of compounds so that the animal testing can be more concentrated, he added.

The program should only be used as a first step before laboratory testing since the forecast is based on "a probability rather than an absolute," Pixley noted.

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Independence Lost During '60s

Audit Computers Seen 'Freeing' Auditors in Future

By Frank Vaughan
Of the CW Staff

HOUSTON — The most significant factor affecting auditors today is their loss of independence during the 1960s, according to Donn Parker, senior research analyst at Stanford Research Institute (SRI). Parker told an audience of 500 at the 5th Annual International Conference of the EDP Auditors Association here recently that auditors can look forward to regaining this independence as time progresses.

"During the 1980s, DP auditors will disappear — at least in name," he predicted. All auditors will be DP auditors and the title will revert to its generic name.

Parker sees the emergence of an audit computer, a prediction that was echoed by other speakers during the three-day conference. This individual computer for audit organizations will be a major factor in regaining independence for auditors.

Calling for a show of hands, Parker noted that less than 10 of the assembled auditors currently had their own audit computer and speculated that it might be interesting to ask the same question next year when the auditors meet in Dearborn, Mich.

DP auditing has not been keeping pace with the needs of the industry during the 1970s, he said. Part of this has been caused by the resistance of traditional auditors, yet this resistance diminishes yearly, he noted.

A second cause Parker cited was that management has not recognized the need for DP auditors until recently. Justifying this contention, Parker showed the results of a survey taken by SRI in which fully one-third of all organizations queried stated there was no benefit to a DP audit.

A third cause of the professional's inability to keep pace has been that the skills and capabilities are only in the formative stages. This, he sid, is being remedied and soon will no longer be a problem.

Switching to the area of DP crime, Parker suggested that the DP community is always going to have crime with it. Although the crimes are going to remain the same — fraud, theft, larceny, embezzlement, espionage, sabotage, conspiracy and extortion — the nature of the crimes will change, he predicted.

"We are now talking about automated crime and our notion on the concepts of crime is changing," he said.

Future DP crimes will encompass many different areas, he said, including massive frauds, organized crime, coercion of technologists, injury to people and malpractice. Additional crimes will include violation of privacy, wire tapping, violation of intellectual property, computer ouput hoaxes, time accelerated frauds and geographic independent frauds.

And even murder by computer is not to be disregarded, he said. SRI already has a case in its files in which a person was murdered by a process control computer. Of course, it happened on the television series "Barnaby Jones," but the concept is there just the same, he cautioned.

DDP Observers Find Decentralization Not Just Passing Fad

PHILADELPHIA — Although some observers of the trend towards distributed processing have said it is just another manifestation of the craze of decentralization that hits DP every nine years or so, members of a panel at a recent conference here disagreed.

"Once users have the power within their own organization it is very difficult to go back to a centralized system," Frank Finch, manager of on-line systems at E.B. Squibb, said. Squibb originally was centralized and then became decentralized. Another swing of time brought an effort to recentralize, he said, but "now it's very convenient to have the best of both worlds."

"I see several conflicting trends," Steve Heffner, an independent consultant, told the group. "I am around systems that are both centralized and decentralized in the same organization," he said. The economics of centralization are changing, he indicated, and "the productivity of personnel associated with a centralized system drops," he continued.

On the other hand, decentralization provides the problem of duplication, but "I think the sophistication of software and radical drop in the cost of hardware will swing the pendulum toward decentralization," he concluded.

The Penn Central Railroad, now organized as Conrail, began in a decentralized state with about 28 computers, according to Bud Bocher, manager of information services for the marketing department at Conrail. Conrail became centralized at one point, but "we are now working back towards minis," he noted.

"The only reason decentralization has come about is that centralization is no longer economical, George Trimble, president of T-Logic, Inc. said. Trimble predicted the day of the large single mainframe is over and there will not only be a decentralization of hardware but of applications as well.

Technalysis Now Acting As DP Security Consultant

SOUTHFIELD, Mich. — The Technalysis Corp. has recently expanded its computer technical services to include computer security services and computer crime investigation consulting.

These services include disaster planning, computer security site surveys, security management consulting, communications security, computer crime investigation consulting and computer security/crime investigation educational workshops.

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Cuts Transcript Delivery Time

DP-Aided Court Reporting Can Speed Appeals: LEAA

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Computer-aided court reporting can reduce by half the time it takes to obtain court transcripts and so speed the appeals process, according to a study released here recently by the Justice Department's Law Enforcement Assistance Administration (LEAA).

Financed by a $230,000 LEAA grant to the National Center for State Courts, the 20-month study focused on the Philadelphia Court of Common Pleas. In that court, automated reporting reduced delivery of a transcript from an average of 37 days to 18 days.

The Philadelphia court found computer-aided transcription (CAT) sufficiently successful that when funding for the 14-month demonstration program ceased, the project was continued.

But while CAT can be commercially feasible, its implementation can also be "a formidable task," according to the study, entitled "Users Guidebook to Computer-Aided Transcription." It was written for the National Center for State Courts by J. Michael Greenwood and Jerry R. Tollar.

Several other courts have tried CAT and their success varied in accordance with preparation, design, selection, installation and operations management, the study said.

Improving Stenotype Method

A multistage, labor-intensive process, the stenotype method is the predominant technique used to record and transcribe court proceedings. CAT "is a technological approach to improving and expediting the stenotype method by reducing the reporter's involvement in the burdensome transcript preparation process," the study stated.

Courtroom testimony is recorded on a modified stenotype device that produces paper notes but which also records the reporter's keystrokes on cartridges or cassettes that can be ready by I/O devices, the authors explained.

An IBM 370/145 running under DOS makes a first translation of the electronically recorded stenotype notes into "reasonably accurate English prose."

This translation is conveyed either on magnetic tape or through a telecommunications system to a text-editing subsystem consisting of a minicomputer, a CRT for editing by the court reporters, a dual disk system for storage and a cartridge/cassette reader, the study reported.

The text editing corrects any errors in the format or text of the transcript produced in the translation by the mainframe. The printer produces the final official transcript once text editing is completed, the guidebook said.

Philadelphia's text-editing subsystem consists of a Data General Nova 1200 mini with 24K core storage; Diablo 2.4 M-byte dual storage disks, an Iomec 312 input cartridge reader and two Beehive Superbee CRTs.

A Dataproducts 2310 line printer and an off-line decollator and burster complete the court's CAT configuration.

In making their study, Greenwood and Tollar examined the CAT implementation in the large-scale Philadelphia court operation. They also monitored the progress of CAT instituted or demonstrated in courts in Baton Rouge, La.; Cincinnati, Ohio; Dallas; Detroit; Tucson, Ariz.; and 20 locations of the U.S. federal district courts.

Finally, the study's authors evaluated commercially available CAT systems for the courts by establishing production standards and assessing CAT vendor capabilities. The conclusions they reached concerning the four vendors in this field (Baron Data Systems; Stenocomp, Inc.; Stenographic Computer Systems and Stentran Systems) are included.

In analyzing the Philadelphia CAT project, the researchers looked at the number of days needed to prepare a record of court proceedings using CAT, the total cost per page related to the transcript's preparation and the percentage of time the court reporters were involved in the transcription process.

Economically Competitive

When developed with proper management controls, CAT is economically competitive with traditional transcription methods. In 1976, the actual transcription cost in various courts ranged from 70 cents to $1.75 per page. These costs are significantly down from the $1.50 to $2.25 per page estimates made in 1974.

CAT does permit better utilization of court reporters, both for recording courtroom testimony and for preparing official transcripts, according to the study. But of all official court reporters, only 40% to 60% are sufficiently accurate and consistent in their notetaking to permit cost-effective computer transcription of their notes without extensive editing.

The study recommended that courts experimenting with CAT should select reporters who are accurate enough for the mainframe to produce a first-run translation that is 95% accurate and who can edit text on a CRT at the rate of 25 pages per hour.

In the future, more stand-alone CAT systems, consisting of a single minicomputer capable of totally producing CAT, including translation, text-editing and printing operations, will be developed, the study stated.

Copies of "Users' Guidebook to Computer-Aided Transcription" can be obtained by writing: National Center for State Courts, 1660 Lincoln St., Suite 200, Denver, Colo. 80202.

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Chicago's Poor Get DP Courses

By Catherine Arnst
Of the CW Staff

CHICAGO — The Chicago Urban League has started a computer training program for poor persons with help from both private industry and the government.

The program trains students at the "dirt cheap" price of $85 per pupil per year with the aid of extensive private donations, Darrell Perrish-Johnson, director of the computer training school, said.

The school, which opened April 4, currently has 59 students (one dropped out) in three courses and plans to train 721 over the next four years. Currently, there are three areas of training: operations, programming and data entry.

The programming course lasts 12 weeks, the operating course, nine and data entry, eight weeks. The first two require high school or equivalent education, while data entry requires an eighth grade reading level, Perrish-Johnson said.

The students are selected from the state's Comprehensive Employment and Training Act (Ceta) program and are basically low-skilled people who need training to be employed, she said.

There are 31 males and 28 females, and the ages range from 18 to 43, with most of the students in their mid-20s. Race is not a consideration, she added.

Three of the students have college degrees, 24 have some college education and five do not have high school diplomas, she said.

Planned Since '71

The school had been on the drawing boards since 1971. It was started with donations of $96,000 from Chicago businesses.

In addition, IBM donated a 370/135, four 3742 dual data stations and four people to manage and teach at the school.

Montgomery Ward donated 6,710 square feet of downtown office space rent-free and with utilities paid, according to Perrish-Johnson, who added that some say the firm is competing with Sears Roebuck, which has sponsored similar programs.

Without these donations, the school could not have opened, she said.

The state reimburses the Urban League, a nonprofit organization, for all the school's operating expenses, and the Ceta program pays students $2.30/hour to attend classes. The classes run eight hours a day, five days a week, and students are not allowed to have another job while in the program.

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Cost Accounting Method Seen Important to Operations

By Ronald A. Frank
Of the CW Staff

DALLAS — A DP center's cost accounting method provides information to management that can be significant for business operations, according to speakers at a recent conference session here on guidelines for cost accounting practices.

The collection of cost data means it is usually necessary to set up functional cost centers within a company, Norman Statland, of Price Waterhouse & Co., said. In a typical company, this can range from three to 20 or more centers, depending on the size of the firm.

In order to determine where the centers are to be located, it is normally best to use the hierarchy of the organization, thereby establishing the centers according to their functional activity and their relative importance to the firm, Statland said.

One of the benefits of establishing a charge-back system for user departments is that it separates jobs with "real needs" from those which have a lesser priority, he noted.

"If costs can be measured and work effort measured, then rates can be established for charge-back procedures," Statland said. If work effort can't be measured, then the task is probably an overhead function.

The type of costs that should be folded into a charge-back system for user departments include salaries, occupancy costs, equipment charges, supplies and communications costs. Cost structures will fall into either the direct or associated cost category.

The prime reason for establishing a charge-back system is to foster systems planning within a company, according to John Dratch of the J.C. Penney Co.

Most managers react to measurement against expected budgetary performance. In this regard, the creation of a charge-back system requires budget projections of user department needs, he said.

This in turn leads to establishing a user rate based on the department's DP requirements, Dratch explained. Often management can use a predetermined rate to measure the efficiency of a DP center.

'Potential Trap'

Statland disagreed with this concept, pointing out that it could be a "potential trap." He said that if a DP center were operating at 70% capacity as a normal parameter, any major fluctuations in operating patterns would raise questions from management.

Questioned on whether and when jobs should be farmed out to noncompany sources, Dratch said he believed the DP department should make these decisions based on available budgets and in-house expertise.

The panel agreed that the next step after the implementation of a charge-back system would be initiating a transaction costing scheme.

Firms will be going to a transaction pricing system in the future, but this will be accomplished only when a company has a good idea of what its DP costs are.

Although no "hard and fast rules" exist for charge-back systems, according to Statland, a key to making the process work is to tie budgetary guidelines to the charge-back rates.

In many firms, the establishment of a charge-back system is very beneficial because often "they don't know what their costs are," he said.

Public TV Station Borrows Mini, CRTs For Annual Auction

NEW YORK — Lucky bidders at WNET Channel 13's recent third annual auction recently were greeted by customer service volunteers at CRT workstations when they picked up their booty.

The CRTs were linked to an ICL, Inc. 2903 minicomputer on loan to the public T.V. station from the vendor, according to Frank Bonanno, director of DP.

"Usually we ask for all sorts of support services from the community and we asked ICL if it would lend us a system," Bonanno said. The station has an ICL minicomputer of its own, he added.

The system has been credited with reducing the start-up time of the auction significantly and simplifying the handling of the more than 10,000 items that were auctioned since June 3.

Starting in mid-April, the system was fed information through ICL Direct Data Entry (DDE) devices about each donated item, including its name, its identification number, a description and the name of the donor.

After the initial inventory was created, 14 CRT units were positioned both at the auction site and at the warehouse receiving area. The two CRTs at the warehouse were used to check the items upon delivery and to code each item for its location.

Five of the consoles were used to enter winning bidder information, including names, phone numbers, amounts of bids and dates of pickup.

Another several CRTs were in the reception area to validate winning bidders. After they were validated, the method of payment was entered into the system and the necessary receipts were obtained to release the item and complete the cycle, he added.

For the last two years the station used its IBM System 3, which it has since replaced, to update the auction information and print reports. "A lot of paperwork was required at the auction," Bonanno said, and the elimination of this paperwork by using the ICL system will reap considerable time and handling benefits.

The totally dedicated system ran ICL's Transaction Processing System. A consultant from the vendor came from England to help the station with this particular software.

The only thing that could have gone wrong is "the people factor," Bonanno said. Most of the people handling the CRTs were volunteers who may not have been familiar with the way terminals work. However staff was on hand to handle any problems, he said, and the auction ran smoothly.

The station's loaned system had 40K words of memory, two 60M-byte disk drives, two DDE devices, a 600 line/min printer and 14 displays.

WNET's own ICL system, which is used to keep track of membership or station backers and general business applications, has a 40K word CPU, console with keyboard, three 60M-byte disks, one 10M-byte fixed disk, a 300 line/min card reader, a 1,500 line/min printer, four DDE stations and several CRTs.

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The Waves of Change

By Charles P. Lecht

Whither virtual? Lecht believes 'virtual storage, virtual processors, virtual I/O concepts and virtual terminals will create the framework for achieving the critical ease-of-use objectives' of the next generation. That generation is already on its way in the form of such 'bridging devices' as the IBM 3033.

CHAPTER VIII
(Continued)

When virtual storage (actually a design compromise) was first developed in 1956 (through the University of Manchester's Atlas computer project), the primary objective was to overcome the high cost of real main memory. In the mid-1970s, semiconductor main memory has become relatively inexpensive, with prices dropping steadily.

Is the virtual storage technique really necessary later in this decade?

From the cost-of-memory point of view, the answer is still yes. Moreover, as a programming aid, virtual storage and virtual machine techniques are very important. Although MOS storage will continue to decrease in cost, users will never satisfy their appetite for more and more on-line storage.

The IBM 370 virtual storage implementation is crude in that all I/O operations (Channel Control Words [CCW] and buffer areas) are translated from virtual to real to virtual by software (no I/O DAT, or Dynamic Address Translation, hardware feature exists). This causes on average about 15% CPU overhead. Actual overhead depends on the number of CCWs, among other factors.

In contrast, the Fujitsu M-190 design, which is 370-compatible, has already implemented an "I/O DAT box."

Virtual Machine/370 is the eighth operating system within the 370 series. This is a technique which allows the system to control multiple "virtual machines," each with its own user operating system.

The VM/370 operating system (with microcode assist features) is the foundation upon which IBM will build a massive programming aid capability. A virtual machine concept permits several users to utilize a subset of hardware resources with total separation and protection (while the resources appear to each user to be unshared with anyone else).

With VM/370, the programmer assumes the memory and other resources to be practically limitless (16M bytes per user, maximum). As such, large complex programs can be written more quickly. System/80 will create the basic architectural foundation for the new application development environment and for later improvements in software, microcode and hardware technology.

Virtual techniques will also enable IBM and other innovative DP manufacturers to construct information security systems. Privacy of data will be a vital part of the system. For example, control of fetch commands is an inherent part of VS. Critical data will be fetched only when proper authorization is included in the command.

In remotely or locally distributed systems, certain processes and data will simply be unavailable to some users.

'New and Better Tools'

Virtual storage, virtual processors, virtual I/O concepts and virtual terminals will create the framework for achieving the critical ease-of-use objectives.

In addition to the programmer aids mentioned above, system software should also contain improved debugging tools. Very importantly, system changes should be nearly transparent to the user (system resources should be accessed "logically," not physically) so that previously checked-out programs will be unaffected by hardware configuration changes (except, of course, in terms of performance or response time). This concept is extremely important in that it simplifies upgrading, or migration to new hardware.

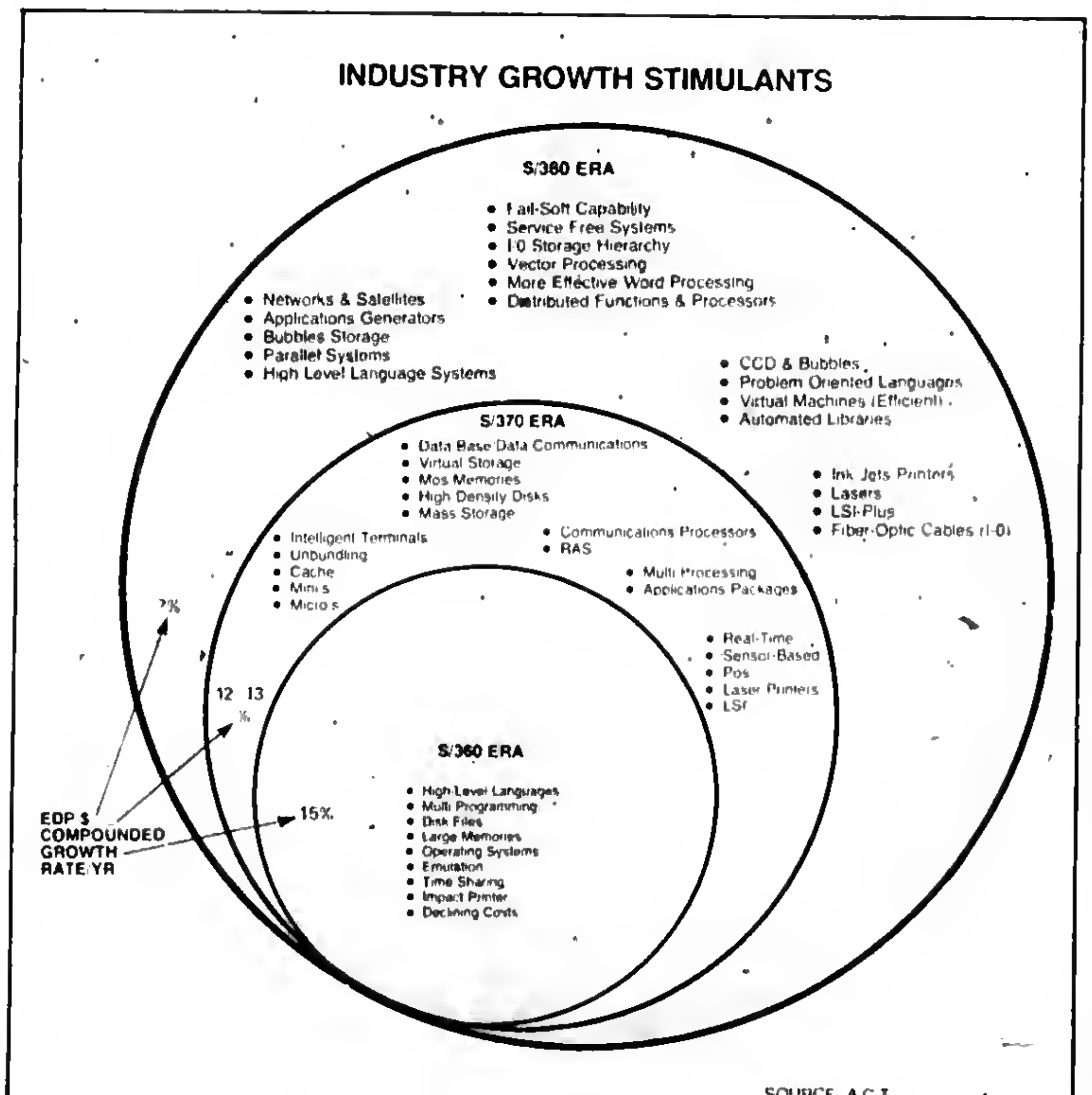


Figure VIII-6

Accurate predictions of performance of a given configuration in a given environment must be possible. With this in mind, installation managers will be given new and better tools for evaluation purposes, to assist them in optimizing the total system design.

System profiles, component performance and batch/real-time processing efficiency will all be measured with appropriate new techniques. Use of these methods will even permit the measurement of the impact of one operating environment on another, when both utilize and share the critical resources.

After a system is installed, it should have the ability to monitor its own performance. Workload status as well as hardware utilization information can all be displayed. The total system should remain responsive to changes in conditions, automatically and at all times.

The system of the next decade must minimize the need for human intervention and dynamically allocate resources and schedule workloads so that throughput and response time requirements are satisfied. Automatic error correction, retry techniques and on-line failure analysis must be available.

On-line systems of the 1980s will rarely shut down. Continuous processing results in more work output per dollar of investment in the system or network. IBM discussed this "service-free system" (SFS) in the Management Review Committee minutes of April 19, 1971.

Business Considerations

IBM cannot obsolete the 370 series with System/80 on a price/performance basis *alone*. Leasing companies, together with independent, plug-compatible manufacturers (PCM), will find many ways to enhance and extend the life of their vast inventory of used 370s (as they did in the past with 360s).

Newer peripherals, higher density memories and similar embellishments, together with greater discounting, will all inject new life into the "old" partly or fully depreciated 370 systems. Transaction pricing may be just around the corner.

IBM is well aware of this problem and System/80 must, therefore, obsolete the 370 on a functional and reliability basis, clearly demonstrating "ease of usage" or "people productivity" benefits which more than compensate for reduced prices of "old" 370s from third parties. Obviously, greater "raw" performance/price will also be expected by then.

According to IBM, recent studies of the DP budget have shown "that a larger and larger portion is comprised of *personnel cost*, as hardware price/performance continues to improve, decreasing the hardware portion." A 1970 study stated that "the personnel portion was 53% of the budget compared with 35% for hardware and 12% other."

In 1973, IBM found that *application maintenance* absorbed 42% of the people costs while only 52% was allocated to "new application development."

Other surveys, conducted by IBM in 1971, attempted to break down the programmer/analyst time devoted to conversion efforts, maintenance and new development. These results showed that, on average, 17% of the application programmer's or analyst's time is devoted to conversion, 35% is spent on program maintenance and 46% on new application development.

Obviously, maintenance continues to grow as more applications are completed, and it is projected to absorb the lion's share of the user's resources by the latter part of the '70s.

A prime objective of System/80 and comparable systems offered by other vendors, therefore, is to use new hardware and software techniques to increase programmer and end-user productivity in the application maintenance and development areas. One way to achieve this result is to reduce the user dependency on DP "specialists" (analysts, programmers, etc.).

Without these productivity improvements, the user would *not* be able to absorb the increased raw computer performance, and the marketplace would ultimately stagnate.

The 'Bridging' Strategy

During the interim period, prior to System/80, IBM is concentrating on data communications and networks (e.g., recent developments including SNA, SDLC, 3790, 3600, 3650, 3767, 3770, Vtam and NCP) and data management (e.g., 3850, IMS/VS and Vsam). In other words, it is focusing its attention on the "bridging" devices (peripherals, software) and "appliances" (terminals).

I suggest the reasons for this are as follows:

1. Mainframe purchase activity (e.g., 158 and 168) should decrease substantially in 1977-78, and IBM must attempt to fill this potential "revenue gap" with other products (although the anticipated 3032 and announced 3033 processors would tend to offset this potential revenue shortfall).

2. The corporation must get the "appliances" installed before it announces the new System/80 "dynamo"; otherwise, most users will *not* be able to absorb the significantly greater power of System/80 and the market will stagnate (a similar situation arose at the beginning of the 370 era in 1970-71).

3. In order to convert 370 customers over to System/80 as painlessly as possible, it must start a "preconversion" activity *now* (SNA, SDLC, Vtam, NCP and Vsam are some of the key software/firmware "bridging" vehicles).

The end result (if the strategy is successful) is that many of the remote (external to mainframe) terminal devices will be in place; the important data comunications networks and data management functions will already have been converted and remain essentially compatible with System/80 in advance of the "dynamo" announce-

(Continued on Page 17)

RATE OF INCREASE IN MIPS/$

System Series	First Shipped	MIPS/$	Elapsed Period
Early 360s	1965	1:1	
Original 370s	1971-72	2:1	6-7 Years vs. 380 Series
Enhanced 370s	1978-77	3.5-4:1	4-5 Years vs. 360 Series
3033 (3032 & 3031)	1978-79	8:1	2-3 Years vs. 360 Series
System/80	1980-81	16:1	2 Years (Our Forecast)

Figure Vttt-7

IBM'S APPARENT LONG-RANGE STRATEGY SUMMARY

GOALS	SYSTEM/80 METHODS AVAILABLE
Stimulate customer productivity and growth	Greater "functionality," ease of usage, high-level languages and problem-oriented languages, reliability and availability
Unify system software and reduce maintenance costs	One operating system for all users, security/integrity and privacy, distributed function, microcode, simplified software interfaces
Improve system posture vs. competition and lock in user base	More "functionality," accelerate technological rate of change, create new de facto standards, innovate
Reduce PCM exposures (peripherals, terminals and memory)	Distributed function, integrated packaging, microcode, multiple unique adapters, SDLC and loop attachments, complexity, host operating system software dependency
Increase profit margins	Exploit IBM economy of scale via LSI, common circuits and building blocks, unified software support and maintenance
Totally obsolete the 370 (eliminate or reduce used computer exposure)	RAS, functionality, privacy and security, ease of usage, greater effective performance, easier conversion, stabilize or reduce the people costs
Optimize FE/SE resources	Remote hardware and software diagnosis, remote Systems Engineering Application Development Services
Prevent downgrading	Special system packaging, software "diodes," controlled subsystem attachment by System/60 model

Figure Vtlt-8

(Continued from Page 16)

ment.

Volume production and deliveries of the Model 3033 will not get rolling until about the second or third quarter of 1978. Therefore, the vast majority of IBM customers will install this product in 1979.

Considering the huge influx of orders, one can extrapolate an enormous potential customer financial commitment over five years of nearly $8 billion, based on an estimated maximum production capacity of 400 units per year (worldwide average) for five years, or 2,000 units at about $4 million each. In contrast, peak 370/168 production or shipments of about 275 units occurred in 1976.

In light of this, one must ask: What is the expected life span of the 3033?

Short Life Span

According to R.T. Fertig, an industry analyst, the IBM 3033 and its forthcoming additional members — models 3032, 3031 and 3033 multiprocessors — appear to represent *interim* products with a relatively short competitive life span. Some of the evidence supporting this conclusion is as follows:

1. Lack of Architectural Improvements

A. The 3033 has a limited address range of 24 bits (16M bytes), which is insufficient considering the 100M byte main storage capacities expected in the early 1980s.

B. Like the other members of the 370 series (and other competitor systems), the 3033 cannot be "certified" as a secure system because of inherent architectural limitations in both hardware and software.

C. The 3033 channel functionality and total bandpass is still too restrictive (1.5M to 3M byte/sec) to handle a hierarchical storage structure with high speed staging devices such as charge-coupled devices, bubbles and bulk MOS storage devices.

D. Although the reliability, availability and serviceability (RAS) characteristics are sufficient for the 1970s, we believe that far greater RAS capability is essential for the critical data base/data communications applications of the 1980s.

2. Minor Technology Enhancements

A. The 3033 processor circuits are effectively about twice the density of the Model 168 and not state-of-the-art (e.g., the three-year-old Amdahl 470/V6 or Fujitsu M-190 provide higher density circuits).

B. The processor must be water-cooled because of the high level of heat which must be dissipated.

C. The main storage chips are still 2K bits vs today's delivered 16K-bit memory chips.

3. A Bottom-Up Design Change

An IBM spokesman explained the approach taken to the 3033 thusly: "We took the best of the 168 design and improved on it" to achieve greater instruction throughput or millions of instructions per second (Mips); e.g., buffers were expanded, extra registers were added, the I-unit was enhanced, interleaving level was doubled, etc.

It is also apparent that the 3033 was rushed to the market (believed to be a very short two-year development cycle vs. a typical five- to six-year phased development) in response to serious competitive challenges from the plug-compatible Amdahl, Fujitsu, Hitachi, Itel, Control Data Corp. and other mainframer products, e.g., Burroughs B7800, Univac 1100/80, Honeywell Information Systems 66/85, etc.

4. A New Generation System should be Introduced by 1980

A. The code name for the System/80 project is "New Grad." The high end of S/80 is known to be under development by an organization under the direction of Dr. John E. Bertram, IBM Systems Products Division vice-president of development and manufacturing.

B. We believe that "New Grad" will represent a major, but evolutionary and compatible, architectural and technological improvement over the 370 Series (including models 3033, 3032, 3031, etc.) and that S/80 will directly and effectively address the data security, ease of use, RAS and other vital functional requirements for the early 1980s.

5. Accelerating Rate of Technological Improvement (Performance/Price)

In 1971-72, the earlier versions of the 370 series represented less than a 2:1 *mainframe* performance/price improvement over the 360 line (using the Model 50 as a base for comparison); the 360/50 was initially delivered in 1965 and its successor, the Model 145, was first shipped in 1971.

By 1976, the substantially improved models 138 and 148 (among other 370 models) established a new performance/-price curve of about 3.5 to 4:1 compared with the 360/50.

Finally, by mid-1978 or 1979, the 3033 (also models 3032, 3031 and multiprocessor versions) will nearly double this performance/price (Mips/$) relationship such that a 3033 processor will offer approximately 8:1 performance/$ improvement ratio vs. the 360 curve.

In summary, the rate of increase in Mips/$ is accelerating as indicated in Figure VIII-7.

Dilemma for 3033

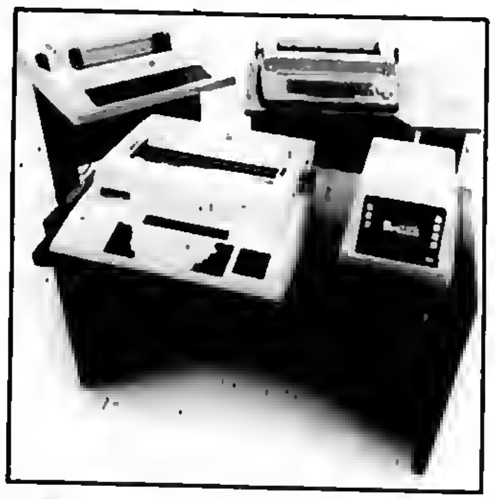
Assuming that the factors in the chart (admittedly circumstancial evidence) are approximately correct and that some members of S/80 are introduced by 1980, would it be prudent for IBM's 3033 customers to be locked into a four-year lease or purchase the 3033 in 1978-79? Obviously, the answer to this key question would vary depending on the individual customer circumstances.

IBM management may also decide to extend the life of the 303X line and delay S/80 one or two years; i.e., why take the risk of introducing new concepts, architecture and technology when the customer base is content with the old structure with improved Mips/$?

Another possibility is that S/80 may be a bottom-up announcement sequence (S/370 was top-down) and IBM wishes to avoid the typical "bubble" order effect when an architecturally new series is introduced with the obvious initial revenue shortfall. Therefore, one solution would be to lock in the high-end customers prior to unveiling S/80 at the low end (370/115 and 125 level).

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, the Programmer's Algol, the Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.



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Editorials

What Do You Think?

Often in the past we have advocated copyright protection for computer software as opposed to patent protection for computer programs. We may have been wrong.

We still don't like the idea of patent protection, but a long dissent by author John Hersey [CW, July 4] to the recent working report of the National Commission on New Technological Uses of Copyrighted Works (Contu) made us pause in our advocacy of copyright protection for programs.

Is a computer program really an act of imagination like a novel, poem or long piece of nonfiction? Is it in the same class as the written word in magazines and newspapers?

As Hersey said, each program may be considered a written creation of an author up to a certain point, but "beyond that point the same program is embodied in material form and becomes a *mechanical device*, which is engaged in the computer to become an essential part of a mechanical process.

"Thus the computer program is something strikingly new in our culture," Hersey added.

Perhaps, then, it is not a good idea to try to fit this new idea, a Janus-faced mixing of art and science, into an older system. Perhaps a new form of protection is needed, designed specifically for this new concept.

What do you think?

Time to Crack Down

Two people at Univac have been arrested for allegedly stealing time on a computer owned and operated by that firm, but the charge is mail fraud and conspiracy since there is no law covering computer crimes and criminals [CW, July 4].

But all that might change if Congress passes a new law proposed by Sen. Abraham Ribicoff (D.-Conn.) which would specifically cover this insidious type of white-collar crime.

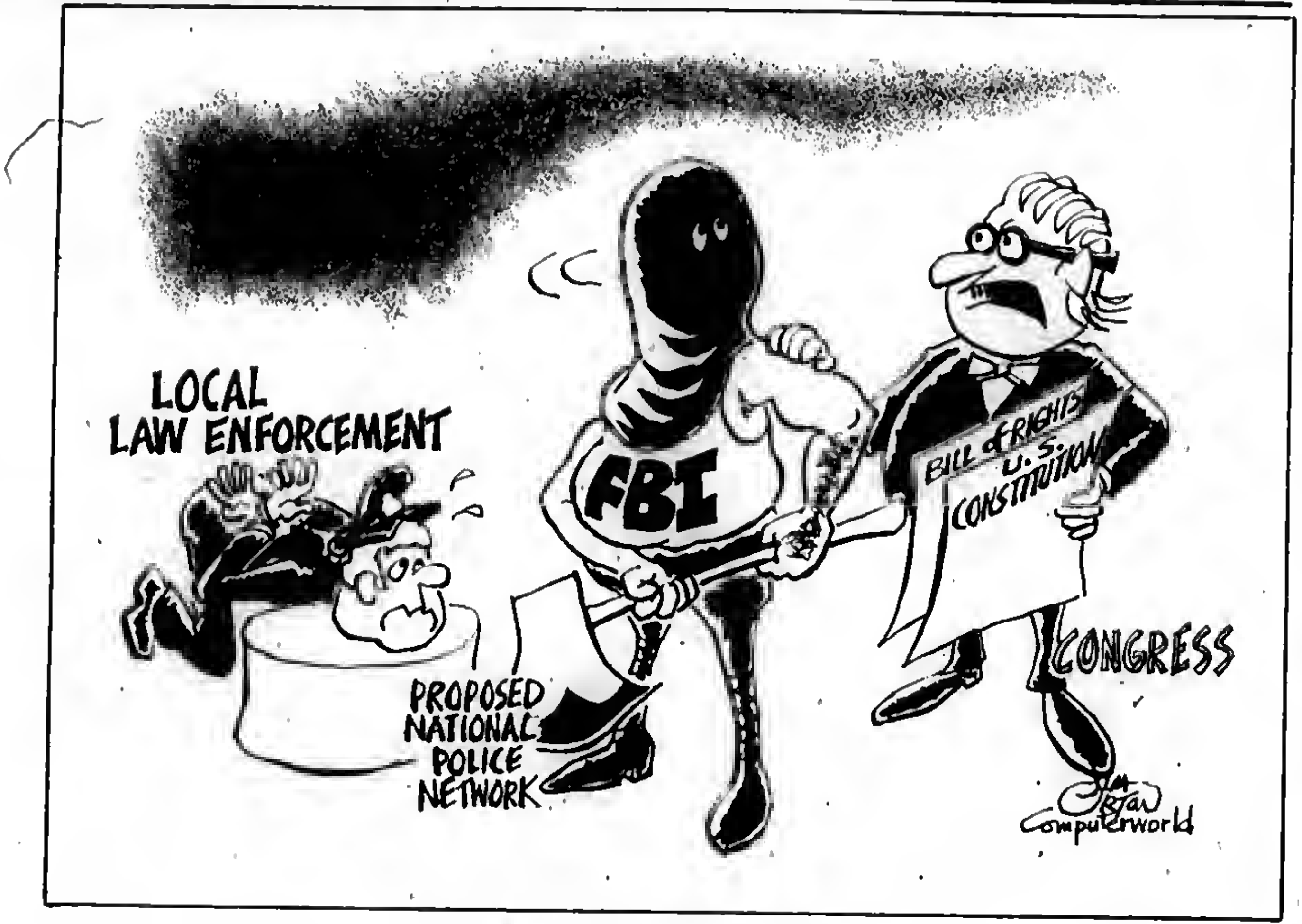
It is a needed bill that is long overdue.

For too long white-collar crime has been tolerated in this country. The penalties for such crimes are not as stiff as those for other crimes — the embezzler gets a shorter prison sentence than the armed robber, even though the amount stolen is often higher. The computer criminal, when rarely apprehended, is tried for such things as mail fraud or wire fraud with relatively light penalties.

The Ribicoff bill would change all of that. It calls for prison terms of up to 15 years and fines of up to $50,000. Its existence would make law enforcement officials more aware of such crimes, hopefully leading to programs to train officers to detect such crimes, which too often go undetected today.

The bill is a good one and it apparently has bipartisan support ranging from liberal Democrats like Senators Ribicoff and Edward Kennedy to conservative Republicans like Strom Thurmond and Robert Griffin.

The legislation should be a high-priority item and people in the computer community should support it wholeheartedly, since most are honest and hardworking and should want to weed out the few bad apples in the barrel.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'There Are Only Two Problems . . .'

Letters to the Editor

Weil Modifies View of IMS/VS, But Lecht Finds It Still 'Poor'

Charles Lecht, in his book *Wares of Change* quoted my assessment of IBM's IMS data hase programming system [CW, May 9]. My observations were based on the views of an IBM user group which had been assembled in San Francisco by an independent market research firm.

It may interest you to note that subsequent to this user meeting, which was held in April 1976, I modified my views on IBM's IMS/VS per the attached article dated Oct. 11, 1976. In fairness you may want to publish the paragraph relating to IMS/VS in my Oct. 11, 1976 report.

Ulric Weil

Morgan Stanley & Co.
new York, N.Y.

Weil enclosed a "Progress Report" on IBM published by Morgan Stanley & Co. which said, in part, "Recent analysis reveals that IBM's much-maligned IMS/VS data base system (see our *Progress Report* dated May 7, 1976) is now performing more satisfactorily than we had expected. (Our observations last spring were based on data relating to IMS/360, collected in late 1975.) IBM's recent improvements of IMS/VS appear to have remedied much of what was wrong with IMS." Ed.

- - - - - - - - - - - - -

In reference to Ulrich Weil's letter to you, IBM's principal medium- to large scale data base offering, IMS/VS, may in fact he performning more satisfactorily. Generally, however, all manufacturers tend to improve their product offerings over time if they wish to remain competitive.

The question, then, is how one can quantify this relative improvement and evaluate the true customer perception of IMS/VS. Most IMS/VS users are not on latest versions. Not unexpectedly, the newest version package price has recently gone up.

A recent survey of over 500 IBM installed data base users indicated only about 12% are currently using the old IMS2 (360), 34% are using IMS/VS (DB) and approximately 27% were running IMS/VS (DC). Obviously, some overlap of survey response between the DC and DB versions is probable; however, surprisingly, nearly 30% were using Mark IV (a non-IBM data base package).

Moreover, the same extensive study found that on the average about 35% of the current users think IMS/VS is not suitable for their future needs.

In our judgment, based on this survey as well as upon Advanced Computer Techniques Corp.'s extensive experience dealing directly with data base users, IMS/VS has improved. That is, it has moved up from atrocious to poor, with CICS/VS possibly having taken over the spotlight in the atrocious category.

Charles P. Lecht
President

Advanced Computer Techniques
New York, N.Y.

In Defense of Consultant at Rest

Regarding the photo front and center Page 1 of your June 20th issue, please be advised that Roger Buchanan's phone has not stopped ringing since.

The unfair implications of this picture have been widely misinterpreted, as Mr. Buchanan is one of our senior staff consultants and was in Dallas demonstrating a microcomputing system we at Performance Development Corp. have developed for a client.

Mr. Buchanan is simply exhibiting PDC's innovative flair for going to the source for the requirements statement. That such a source may have departed does not always deter us.

Leo J. Cohen
President

Performance Development Corp.
Princeton, N.J.

Other letters on Page 20 nnd 22.

Data Past

Five Years Ago
July 12, 1972

WASHINGTON, D.C. — Sen. Sam J. Ervin (D-N.C.) charged the Supreme Court with "unwisely and wrongly" ignoring the danger of computer-based data banks when it rejected an attempt to outlaw such dossiers in the Tatum vs. Laird case. To remedy the court's alleged oversight, Ervin introduced legislation in the Senate to prohibit the Army or any military service from conducting data bank operations on civilians.

— — —

DAYTON, Ohio — Codasyl's Programming Language Committee met here to consider a proposal to delete the Report Writer facility from the Cobol standard. The proposal, initiated by the Air Force, called for dropping the RPG-like function because "it was redundant with features in the language and too complicated for the general report-writing needs of the user community."

Eight Years Ago
July 16, 1969

WHITE PLAINS, N.Y. — IBM cut its maximum educational discount from 30% to 10% and announced that effective Nov. 1 it would no longer offer an educational allowance on maintenance agreements.

DP Experts See Need for Better Performance Measures

By Jack Stone
Special to Computerworld

Productivity was my watchword last week. First, I attended the National Conference on Computer Systems Productivity, sponsored by *Government Executive* magazine and the Capitol (D.C.) Area chapter of the Society for Management Information Systems, where I made a presentation on human engineering in the DP environment.

Then, I was invited to give a talk on productivity considerations in the operations department to the DP management group of a large corporation.

My briefing was one of four given the same day by a panel of outside consultants to this company, whose management has become vitally concerend with improving productivity in all areas of its DP activity. The other talks dealt with productivity gains possible through human resource development, systems analysis training and structured design and programming techniques.

As I reflected on my experiences of the last week, I reached several conclusions.

First, the issue of productivity is one of significant and growing concern to management. I believe this interest derives in part from the difficulty senior DP managements are having in justifying their continually increasing budgets to top executives and, in part, from the difficulty top executives are having in justifying incumbent DP managers in their current positions.

I believe few front-office executives feel they have adequate measures or standards of performance or productivity from the DP organization. I suggest the current wave of DP management insecurity has come about because the shakers and movers of business and government organizations are no longer tolerating the absence of valid and comprehensible performance data. They are saying, to paraphrase a familiar machine-room expression, "Get the DP data up or get the DP managers out!"

Second, the arena for determining productivity has vastly broadened — moving from the narrow focus of channel contention for disk drive access to serious consideration of the broadest issues relating to quantitative measures of productivity in terms of user acceptance and organization profitability.

Bob Head said at the conference, "Work on system productivity has been largely at the relatively narrow technical level of seeking to improve performance by obtaining greater 'throughput' from installed equipment.

"What is now required, and is indeed already beginning to take place, is a broadening of this activity through its elevation to the level of top ADP management interest. The utilization of complex and expensive system resources is becoming a problem too great to be left to performance measurement specialists."

Third, a scientific and quantitative approach to performance measurement is moving rapidly into all areas of the DP function. Ken Rau suggested at the conference that "performance measurement applied to application software development, application maintenance, equipment operation, data control and other functions and tasks associated with DP can produce far greater improvements in control, productivity and motivation than can computer performance evaluation techniques alone.

"Furthermore, a performance measurement program can provide management with its first quantitative reports for tracking and analyzing the data processing resource."

On the other hand, the availability of techniques and methodologies for obtaining objective data does not of itself assure a successful productivity measurement program. There is the very practical — but often overlooked — matter of gaining agreement from all interested parties on what constitutes the productivity standard(s), how productivity should be measured and what action should be taken to control deviations from standard.

The Human Connection

"The most difficult task in improving productivity is developing a plan that is comprehensive, cost-effective and acceptable to the many parties involved in the total computer system," Leo Barnecut commented at the conference.

Another conclusion is that increasing attention is being given to the particular challenges of improving the productivity of DP personnel in ways other than providing the time-worn mechanical solutions of more computer time and systems development techniques and methods. One concern is that of seeing human productivity diminish as hardware becomes obsolete.

John Carabello, director of automation policy at the U.S. Department of Defense told the conference that "more than half the government's inventory [of computer mainframes] is mid-Sixties technology. What are the productivity implications?

"We know that over time, there has been a downward trend in the cost per unit of processing power. [We also know that] good management would attempt to parallel the trend of available productivity improvement, but is offset somewhat by the economics of capital investment, the cost of conversion, administrative procedures, etc. Obsolescence can be defined as a continuing divergence from effective management . . . Let's rapidly extend the implications of hardware obsolescence and see where this basic factor takes us.

"The most obvious corollary is that hardware obsolescence induces software obsolescence . . . This leads to another corolary: that we have a problem of people obsolescence. Living in the past of obsolete hardware and software means that the productivity of our personnel does not rise — in fact, it will go down, since we will also tend to neglect training and have problems attracting and holding skilled people."

As a final conclusion, it was abundantly clear the base issue of the setting of standards and the measurement of productivity for a particular *individual* in the DP environment has been largely ignored, with the notable exception of the data entry folks.

Granted, most DP personnel operate as teams, but there are still objective measures that can be established by competent DP managers and supervisors to establish productivity goals — or is it that these people want to avoid measurements of their own performance?

Sale of State's Driver Master Tapes Causes Concern

The idea of using laws to protect privacy from invasion by computer is now generally accepted. This is quite a change. Only a few years ago it seemed that because the noncomputer era had needed no such protection, it would be improper to effectively penalize the computer era by putting additional constraints on computer operation.

The Taylor Report

By

Alan Taylor, CDP

However, the increasing flood of computerized output in various forms gave rise to the realization that action had to be taken. As computer power made the use of large masses of information more economical, personal data became subjected to some questionable uses.

A lot of the controversy swirled about the use of the Social Security number (SSN), which was at that time approved by many of our professional bodies for use as a universal identifier, suitable for connecting records from various areas. The proponents of the universal identifier idea argued mainly on economic grounds. They urged that Social Security numbers should be given out at school age, or earlier. The opponents argued that the dangers of possible abuse by people developing "dossiers" was too high a price to pay for such an economic advantage.

During the struggle, a large amount of unexpected use of the SSN was found to exist in areas well outside its original intention — such as in library cards, student numbers and driving licenses.

As these uses were found and commented upon, it became general practice not to absolutely insist on the use of a person's SSN if he objected to revealing it and having it used, while continuing the practice of normal use of the number for the great majority of cases.

At the same time, privacy legislation went into effect to protect the public from the dissemination of personal data, and the whole issue faded back into near-oblivion, with potential abuse apparently checked.

However, a recent advertisement in the Boston area offering for sale the master file of the driver registrations in Massachusetts made me wonder whether there has been any real change or only a cosmetic one.

Certainly it has raised questions with some readers of this column who feel that their personal data should not be made available by the Registrar of Motor Vehicles without their knowledge and consent. And the facts seem such as to support their fear — even if the current privacy law does permit the distribution of "public records" containing personal data so the legality of the sale seems unquestionable.

Borderline Case

Yet the whole matter makes me uncomfortable. It seems to be a borderline case. No one has suggested that any actual abuse has been identified. The objection comes from the possibility of abuse.

A specific objection has been made by readers to the distribution of the SSN. It has been argued that if the registrar is going to sell the master file, then everyone should have been told of his intention before they were asked to provide their SSNs.

Another objection has been made to the continued use of the SSN for any use if sales are to take place. And I see merit in that point, too.

Yet the real question is whether the public record exemption, in this computer age when the economics of mass data processing are so attractive, makes sense as a blanket exemption from privacy rules. Suppose the registrar had properly warned people about his intention to sell or had completely abandoned the use of the SSN as an identifier.

Suppose the "master file" is in its most innocent possible form — name, address and nothing else. Would there still be an objection to copies of the master tape being sold?

If so, what is the basis for the objection? How would proper access to public records be attained if such mass sales were to be forbidden?

These are the questions that really need answering in order to see why the current situation is uncomfortable. If you have any answers, pro or con, on any of these questions, please let me know. The best way would, of course, be through a letter. But a quicker way may be to use the questionnaire provided here.

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What Are Your Views?

The Massachusetts Registrar of Motor Vehicles is currently selling the master tape of registered drivers in the state. Social Security Numbers are normally used as the license identifier; although if an objection is raised when an application for a license is made, the Registrar will not insist upon its use.

No information regarding the sale or possible sale of the Registrar's master file is given to license applicants at the time they are asked for their Social Security number.

(1) If this were the situation in your state, would you be uncomfortable with the sale of the master tapes?
( )Yes ( )No
Why?

(2) If you were given full information about the future sale of the tapes when you were asked for your Social Security number, would that be agreeable to you?
( )Yes ( )No
Why?

(3) If the use of Social Security numbers were stopped, would that make you comfortable?
( )Yes ( )No
Why?

(4) What other comments or suggestions do you have?

Please send the completed form to Alan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02160. Thank you.

Name
Position
Address

Letters to the Editor

IBM Part in Nigeria Done 'Watson Style'

I was surprised and pleased to find the article, "Nigeria Boosting DP Training" in the May 16 issue of *Computerworld*. In it there is a brief reference to IBM's African Education Center located at the University of Ibadan, Nigeria, and to the fact the university has just graduated its first class of computer science students.

In the face of all the adverse publicity IBM has received over the years, I feel it is important to expand a bit on that story, since I have personal knowledge of that situation and of IBM's motivation for putting resources into it.

In 1962, the late Arthur K. (Dick) Watson, who for many years headed IBM's World Trade activities, decided it was IBM's responsibility to "do something" for the people of the developing African nations. In typical Watson style, he opted for an IBM-sponsored education program.

This program was full-scale DP training combined with the equivalent of about one year of business administration education. It was my good fortune to be chosen as the person to be sent to Africa to direct that activity for IBM.

The story of how Ibadan was chosen as the site of the center; of the selection of 50 students (out of 5,000 applicants from eight countries) to receive full expenses-paid tuition to the two-year program; of supervising the building of the center; of the tremendous cooperation provided by the University of Ibadan and of various U.S. government and private groups; of the innovative teaching techniques employed there in order to make the program a success; of IBM's successful effort to place the graduates of that program in DP jobs in their home countries; and finally, of IBM's unrestricted gift to the university of a fine, fully equipped DP education center is much too long to tell in this letter.

Suffice it to say that Watson's concern for the developing African nations, as manifested in the IBM African Education Center, undoubtedly has changed the lives of hundreds of Africans.

The obvious question is, what was in it for IBM? If my memory serves me correctly, at the time Watson made that decision, IBM's total revenues from all of the black African countries combined would not have equaled that of the tiniest IBM branch office in the U.S.

Watson's motive was to provide a service, the kind that only a company like IBM could or would provide.

Now, 15 years later, IBM's investment apparently continues to provide benefits in keeping with Watson's and IBM's original intent.

Nate A. Newkirk
Mt. Kisco, N.Y.

A Misnomer?

Now that we've settled the disk vs. disc controversy (IBM uses disk so it must be disk), may I ask if the same solution applies to what I consider a misnomer for a date in YYDDD format?

It seems prevalent to call this a Julian date, yet *Webster's Dictionary* says a Julian calendar has 12 months, each month having 28, 29, 30 or 31 days.

Therefore MMDDYY is a Julian date. The Gregorian calendar modified the Julian Calendar as to when leap year occurred and shortened 1582 by 10 days. Still 12 months.

Why then is YYDDD called a Julian Date? I prefer Ordinal Date (ordinal-a number designating the place in an ordered sequence).

Don Dietrich
Seattle, Wash.

'Little Guy' Replies

In his May 30 letter, Robert W. Caugney, vice-president, Applied Data Research, Inc. (ADR), took exception to Michael Hart's comments about National Computing Industries' (NCI) Slick.

It is very interesting to me how the "big guy" starts to squirm when the "little guy" makes big strides (over 300 Slick sales) into his marketplace.

Caugney's assertions were the erroneous ones. The facts are:

First, Community Blood Council of Greater New York, Inc. purchased Slick III on May 21, 1976, when the price was $2,450, not $2,950. This was our Version 2 release, which was not just comparable to, but actually more powerful than the stripped-down version of the Librarian called Librarian/E, which sold for $400 more than Hart paid.

Second, in the May 5 issue of *Computerworld*, NCI announced Version 3 of Slick with prices ranging from $2,450 to $2,950. The $2,450 version (Slick I) still has more power and capabilities than Librarian/E at $2,850, while Slick III at $2,950 is superior to the "full" Librarian at $4,900 to $5,800.

Third, the 20 minutes of ADR technical support service to install Librarian is not comparable to the three days Hart stated, which was not only to install but also to fully convert and become operational.

Fourth, in addition to doing all that the "full" Librarian does, Slick has exclusive features such as dynamic recall, a report writer, multi-level security, complete audit trail facilities, DOS return codes and many others.

I challenge Caugney or anyone else to prove that Slick III Version 3 is not a better product than the "full" Librarian at any price, let alone being $2,000 less expensive.

Frank U. Beck
President
National Computing Industries
Atlanta, Ga.

Thanks for 'Waves'

Your series on "The Waves of Change" by Charles Lecht is very worthwhile. If it had not been for this article, I probably would not have had the opportunity to read it.

I encourage you to continue this type of journalism.

S.W. Logan
Indianapolis, Ind.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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ACPA participates in the Computer Caravan, providing speakers and organizing programs at the various Caravan stops.

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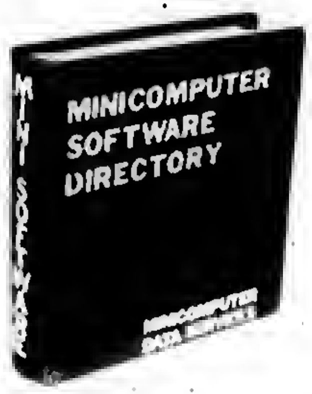

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TECHTRAN

One Attendee's Viewpoint

NCC: 'The Entire Computer Industry Under One Roof'

By Dennis J. Streveler
Special to Computerworld

If you didn't go to Dallas because you were sure your knowledge of computer technology was up-to-date — you comprehend the subtle difference between the HP 3000 Series I and II, you know an IBM 3330 from a 3033 and you were positive you did not want to see more teletypewriter compatible terminals no matter what the price — you would have been in for a shock. For this was the year of the micro.

Names like Commodore's Pet Computer and Apple Computer's Apple II and the already-venerable Imsai 8080 were bantered about at least as freely as "distributed processing" or "networking" or "subschemas." In fact, last year's conceptual buzzwords were often overshadowed by nuts-and-bolts terms such as the S-100 bus, ROM, RAM and logic modules.

It seems clear the industry is perched atop still another volcano. But this one hasn't erupted yet. Software is still in abominable shape (remember the early mini years?) and many micro peripherals are about as reliable.

Micro vendors apparently need some help from Madison Avenue in retuning their ads away from a bit-byte-baud format to something the mass market can understand.

Still, someone needs to address this question: What *can* these machines do which is useful to humanity? In lieu of an answer to this fundamental question, the only market is status seekers and gadget addicts.

But I doubt whether the American home needs another gadget (I'm still trying to understand why we need trash compactors).

However, everyone does assume — and rightly so — that this cheap computer power is valuable and that it will provide logic for a myriad of personal process control, data collection and home entertainment applications. The technology is here and it is cheap.

We know how to write the software (although probably not exactly to Dijkstra's liking). And there certainly is a plethora of eager vendors and retailers ready to pounce on the unsuspecting marketplace.

When the volcano will erupt is as much a riddle as is when Mauna Loa will pop off. Or when the San Andreas will rid us of the Southern California blight.

Strictly Business

No, the National Computer Conference was not *all* micros this year. In addition to the personal computing exhibits, there was another, larger area of exhibits in a more traditional vein.

But this year there was little excitement, few new announcements and surprisingly fewer gimmicks.

Gone was the Data General organ grinder who stood outside the New York Coliseum on those sweltering days last year. Gone were the speakers of national political consequence such as the then little-known, self-proclaimed technocrat, ex-governor of Georgia who addressed NCC in Anaheim two years ago.

And gone, too, were the booth numbers on the exhibit floor, rendering the exhibit maps virtually useless.

As IBM never truly adjusted to (or seemingly comprehended) the implications of minicomputer technology (IBM was often absent from recent NCCs), the two largest minicomputer manufacturers, Digital Equipment Corp. and Hewlett-Packard, were both conspicuously Awol this year.

IBM touted its System 34. (The most coveted button this year was *Computerworld's* "Pray for IBM." Now I know why.)

The usual pitches on business minicomputers, xerographic printing from mag tape, voice response, COM and replacement peripherals could be heard echoing about the cavernous exhibit floor. (I think CDC can now build a 370 replacement from the ground up, including the "Think" sign.)

My vote for "most exciting new product" goes to Texas Instrument's very impressive (and impressively expensive) bubble memory terminal. Incidentally, TI's chairman, Mark Shepherd Jr., kept the keynote address audience spellbound talking about — what else? — microcomputers and the future.

The conference chairman this year was Dr. Portia Isaacson, whose current profession is — you guessed it — microcomputer retailing.

The jazziest exhibit was definitely Univac's. Its multimedia, real-time animation was delightful. But, quite frankly I can't quite remember which product it was pushing this year. Was it its newly acquired minicomputer line?

The program was, as always, a classic study in overchoice. One normally has to emulate a time-slicing discipline of one's own to take in all the "Must" sessions. The program included many well-attended sessions on microcomputers and "personal computing." Surprised?

Reader Commentary

The traditional topics were also discussed, but it is safe to say this NCC was lacking somewhat (by choice, I understand) the trappings of academia.

Not all sessions were of equal caliber, of course. To my dismay, some sessions seemed short on material and actually adjourned early, which to my recollection was unheard of in previous years.

Here are a few tidbits from the sessions:

- "Information manager" seemed preferable to the term "data base administrator." I guess that makes sense, but I've just recently become accustomed to the buzzword "DBA."
- Computer output microfilm technology has been "married" to on-line computer technologies, according to one speaker. A questioner preferred the more descriptive (and accurate) term "shotgun wedding."
- Pioneer Days are always impressive. This year's was even more so. By floating among the exhibits and among the pioneers from Los Alamos, the computer's entire

(Continued on Page 22)

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Letters to the Editor

NCC Showed Interest In Certification Low

It is with bewilderment that I continue to read about how the computer industry is moving ahead on certification when the *people* in the business have very little interest or desire in being certified.

Since my own prejudices sometimes sway my decisions, I took time out to visit both panel discussions on certification at the recent Dallas National Computer Conference. The two sessions were "ICCP and Certification. Move Forward" and "The Certificate in DP/Certification Examinations for Programmers" and both were placed in the management segment of the conference.

My reason for sitting in briefly on these sessions was to determine what interest others have and possibly to change my mind on the overall desires of the industry. Both sessions had fewer attendees than any other I attended — I counted less than 100 in one of them.

If there is any interest in certification other than from the academic community, which has a financial interest, I failed to see it at Dallas. A debate was held and no one cared.

So why not let the creative people of this industry work and contribute to their respective companies and selves and stop trying to convince them that they need to "join" something to be worthwhile?

T.C. Bartz
Oshkosh, Wis.

Sources Sought

Many readers of my introductory article on the Cobol Report Writer [" 'Report Writer' Reduces Coding, Debugging Task," [CW, April 25] have written to me requesting additional sources of information on the Report Writer.

Unfortunately, I am not aware of the existence of any information on Report Writer other than Cobol compiler implementers' reference manuals. I plan to write a programmer-oriented book on the subject in the future, but that does not fulfill the immediate need.

Should any reader know of a good source of Cobol Report Writer information, please cite it in a "Letter to the Editor."

William R. Englander
San Diego, Calif.

Right on the Mark

I would like to compliment *Computerworld* on Part I of the "Role of the Distributor" [Manufacturers Emphasize Significance of Recruitment," CW, June 13].

Speaking from the vantage point of one who has spent the last year bootstrapping a grossly undercapitalized software house into existence, I can testify that the article was right on the mark.

Laurance F. Wygant
Schaumburg, Ill.

NCC: Everything Under One Roof

(Continued from Page 21)

history was visible.

Ed Voorhess, one of the LASL pioneers, describing the IBM card programmed calculator (Jacquard would have loved it), mentioned the fact that it came with a total of eight registers. Yes, eight.

But one could upgrade to a total of 48 by adding modules the size of "ice boxes," each containing up to 16 registers.

Under the same roof one could see the densely packed chips of today and hear predictions of 64K bytes in 8 square inches by 1980.

In the program there were the usual sessions dealing with the relative merits of Codasyl vs. Mumps for data base management, with the value (or lack of same) of the Certificate of Data Processing, and with the (in)security inherent in most operating systems.

Software gurus heard Yourdon and Weinberg and Mills and McCracken. Hardware types were delighted with Amdahl. We were entertained by Herb Grosch and admonished by Jim ("Why Managers Fail") Towsen.

Elsewhere at NCC

You could have loitered, resume-in-hand, waiting to be accosted by a body snatcher. You could have entered the devilish programming contest. You could have visited the Computer Fair and seen a complete computer, along with an impressive array of peripherals constructed completely from surplus and scrap, (i.e., junk).

You could have made the rounds among the hospitality suites after dark — a blessing since Dallas' sidewalks do not roll up after dark, they self-destruct.

The NCC is still the world's best watering hole of ideas, people and machinery — it is quite literally the entire computer industry under one roof.

It is a time of speculation, frustration, contemplation. It is a time of spirited exchanges on most every germaine topic.

I am never amazed when the impressive attendance figures are announced following the closing of the NCC. In fact, I am always amazed that the attendance figures aren't even higher.

See you in Anaheim next June?

Streveler is systems engineer at Straub Clinic and Hospital in Honolulu, Hawaii.

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Vol. 2 No. 2 July 1977

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HP 9896- desk top computing for first time users

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If you can type the word "REMOTE," you can use DS/3000

```
:HELLO MIKE.DCA
 SESSION NUMBER = #S91
 TUE, MAY 31, 1977, 10:49 AM
 HP32002B.00.35

         WELCOME TO MANAGEMENT SYSTEM
         *******************************
```

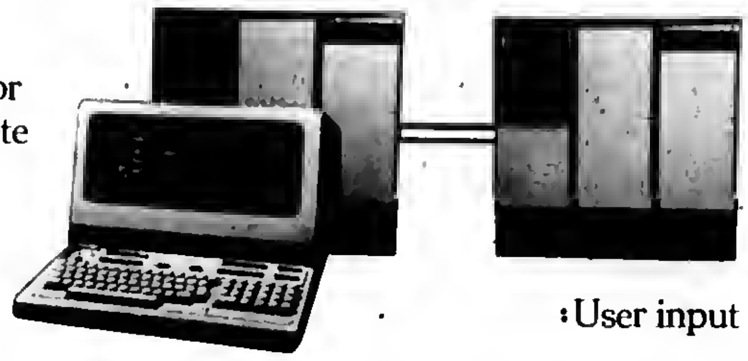
Start a local session
To gain "virtual terminal" access to remote systems, log-on to your local system in the normal manner. Enter the HELLO command.

```
:DSLINE PR2
 DS LINE NUMBER = #L3
```

Open a communications line
Use the operating system command, DSLINE, to establish a link with one or more remote HP 3000 systems (either hard-wired coaxial, or public telephone with modems).

```
:REMOTE HELLO MIKE.DCA
 SESSION NUMBER = #S150
 TUE, MAY 31, 1977, 10:49 AM
 HP32002A.01.H+

          WELCOME THIS IS PR2
         *********************
```



Go remote
By using the same HELLO command as before, but by adding the word REMOTE, you start your interactive session on a remote HP 3000. Now, all the powerful MPE II commands are available for you on both the local and the remote HP 3000 Series II. Your terminal conveniently serves as "virtual terminal" for both.

: User input

MPE II also brings an accounting structure and file security that provide protection against unauthorized use of local or remote HP 3000 systems and their data files.

DS/3000 networks strategically disperse computing power wherever day-to-day work is being done. They implement in hardware and software the organizational communication lines that already exist among the people of a company. The result is computer processing and data communication mapped onto existing company structures, with a lot of timely and accurate information flowing back and forth.

DS/3000 software costs $9,000* for each HP 3000 in the network. System prices start at $110,000* **For further information check A on reply card.**

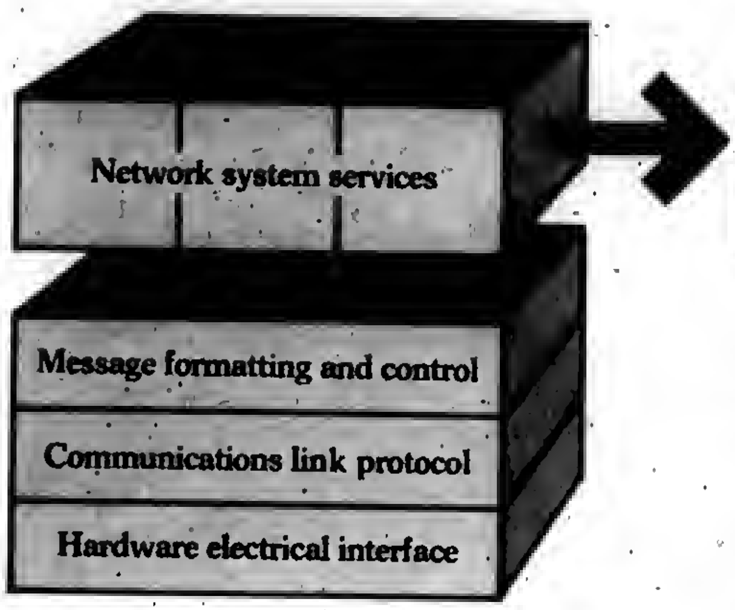
Hewlett-Packard

Layered implementation

Computer users want high level network capabilities that do not require specially trained professionals in data communications. A logical way to accomplish this is to integrate data communications into the operating system and provide transparent access to remote processing and remote facilities. Complex requirements of the data communications environment, such as modem and line control, error checking, and recovery, should be handled by vendor hardware and software and should be invisible to network users.

This principle guided the architectural design of DS/3000. DS/3000 software is organized into structural layers so as to separate matters of routine from matters of user concern. HP software and hardware automatically handles the first three layers.

Accommodate new technology
Technology in communications is rapidly changing. HP is committed to bringing these advances to customers. A layered approach facilitates this. Each layer to a large extent functions independently. HP can make network enhancements to DS/3000, for example, a new line protocol, by providing a new software/hardware update to one layer. This change does not affect either the structure or the usage of DS/3000. HP can move with industry technology. The customer simply purchases a software upgrade or new hardware interface. Applications and programs need not be changed. With DS/3000, users have today's and tomorrow's communications.

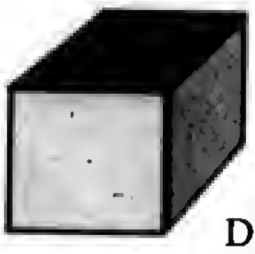

Network system services
Message formatting and control
Communications link protocol
Hardware electrical interface

The layers
The first layer, the electrical interface to external modems, meets EIA RS-232C and CCITT standards. Systems can be linked over common carrier facilities at speeds up to 9600 bits per second or over hardwired lines (coaxial cables) at line speeds up to 2.5 million bits per second.

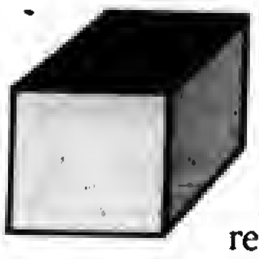
The next layer is concerned with link protocol in a point-to-point configuration. It concurrently multileaves data bi-directionally over half or full duplex common carrier facilities using IBM-compatible Binary Synchronous Communications (BSC) protocol.

The third layer automatically handles conventions of message formatting and manages the flow of messages between systems. Here HP designed its own standard format.

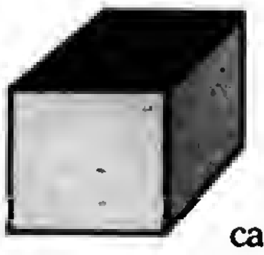
The top layer is the most exciting, for it represents the set of full, high-level system services available to the user on DS/3000.



Interact Locally and Remotely
The remote command processing capabilities of DS/3000 make it easy for interactive users of a local HP 3000 to utilize that same set of capabilities on a remote HP 3000. The local terminal becomes a "virtual terminal"; with it the user has full use of a remote system as if it were local. That includes all MPE II commands, language and utility subsystems, and remote user applications programs.



Share A Resource
MPE II treats all devices as files. With DS/3000, you have full remote file access to all devices and data files on another HP 3000 (after validating your authorization, of course). Smaller HP 3000 sites in a network can share the processing power of a larger HP 3000 using its software subsystems or a variety of peripheral devices. Simply expand the MPE II FILE command to identify the remote system. No application reprogramming is required.



Communicate Program to Program
With DS/3000 separate applications programs running in separate systems can directly and efficiently exchange data and control information with one another, thanks to a set of nine new easy-to-use program callable procedures. Program to program communications facilities also allow one user program to initiate or terminate programs on remote systems.

*U.S. domestic prices only

It's 2 pm Thursday in San Francisco, 5 pm Thursday in New York, and 8 am Friday in Tokyo

Glimpses of an HP distributed system

HP 3000
Sales Office
Tokyo

On a daily basis, the field transmits customer **orders** to the San Francisco factory and New York warehouse. In return, latest factory order **status information** is updated to sales office's files so customer credit checks and factory **acknowledgments** can be made on-line.

international circuits

dial up lines

HP 3000
Service/Parts Warehouse
New York

The warehouse validates Tokyo's **orders** against on-hand quantities and generates shipment documents while updating inventory status.

international circuits

RJE

HP 3000
Financial Control
San Francisco

The latest **master production schedule** is used to generate the company's next period's financial plan.

Product costing results are reviewed to evaluate latest **engineering data control** changes.

hardwired lines

HP 3000
Order Administration
San Francisco

The factory allocates **master production schedules** to customer **orders** and transmits updated **information** to sales offices. For example, Tokyo's customer ship dates are **acknowledged**. While monitoring order statistics, the **master production schedule** is prepared using forecasting information and current backlog data.

HP 3000
Engineering/Manufacturing
San Francisco

Prior to exploding the master production schedule, the engineering staff makes changes on the **engineering data control** system.

HP terminals overcome the language barrier

Being an international company involves more than maintaining overseas operations. It means being sensitive to language, cultural, and social differences.

The sophisticated HP 2640 series terminals respond to one of those differences — language.

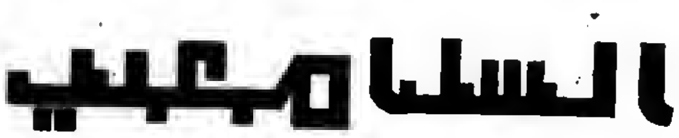
Functional modularity
To simplify implementing new languages, HP localized all the language capabilities on just two character set modules. These modules provide all the capability to use concurrently a combination of four sets — 128 characters each. Characters from bilingual sets can even be displayed adjacent to each other.

Hardware modularity
A single bus is common to all logic modules. Therefore, any module, including those that control the character sets, can plug into any slot in the bus. Any combination of enhancements (more display memory, cartridge tape units, printer capability, or data communications) can be added by simply plugging in the appropriate logic module. For easy repair, just open the terminal, pop out the board, and pop in a new one.

Microprocessor control
All 2640 operations, for example, memory allocation and data communications, are microprocessor-controlled.

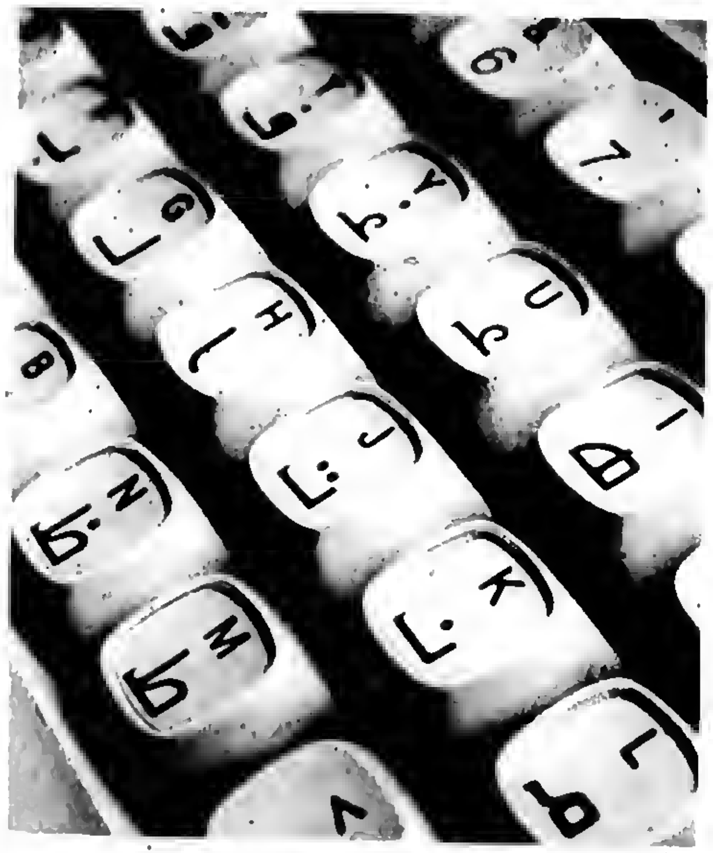
This microprocessor also controls the keyboard. Key functions are independent of their respective position on the keyboard. With this approach, engineers can easily accommodate not only the unique character sets of different languages, but also preferred keyboard layouts.

New Arabic terminal
A new terminal, the 2645R, displays both Arabic and Roman characters. Special design considerations were encountered in implementing the Arabic language. First, the characters had to be aesthetically pleasing, readable, and correctly drawn to capture the script-like Arabic style. A character set allowing for horizontally continuous characters was designed.

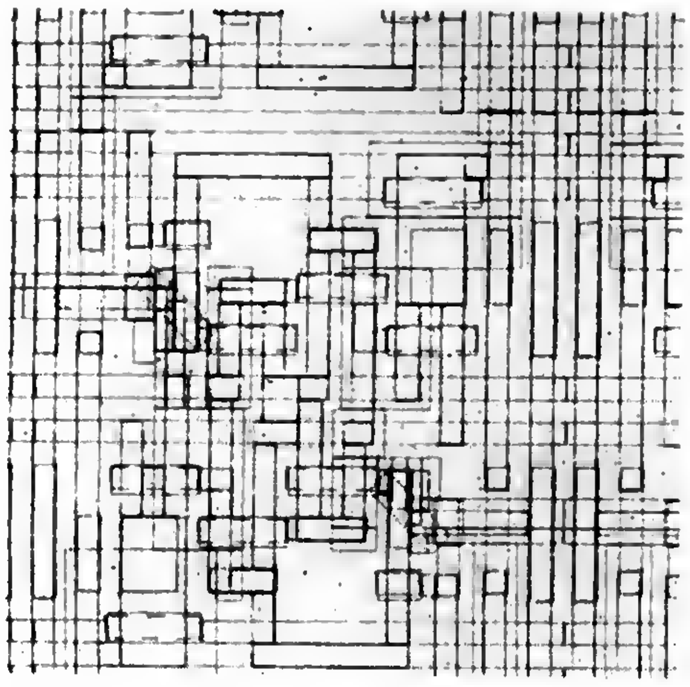


Also, since Arabic reads right-to-left, while the Roman language reads left-to-right, the terminal required a special selector switch to provide both capabilities.

For more details on the 2640 series international terminals, check B on your reply card.



Small and powerful



A life-size section of an intricate, computer drawn plot used in the design process of Hewlett-Packard's new CMOS/SOS single chip 16-bit Micro-CPU.

The XYZs of plotters

We needed a plotting system for our Large-Scale Integration design facilities in Cupertino, California. Our choice: Gerber Scientific Instruments' Superplotter, driven by their choice, an HP 21MX computer.

This computer-controlled plotter draws the line on expensive hand artwork. It offers design engineers the benefits of computerized plotting: flexibility, accuracy, economy, easy interface, and quick turnaround. The heart of the Superplotter, the HP 21MX coordinates and optimizes the plotter's performance to achieve dramatic 0.004 inch accuracy, 42 inch-per-second speed, and 2.8G acceleration.

Automatic drafting machine throughput for most drawings is primarily a result of such high acceleration and speed.

Actual size of HP's Micro-CPU Chip. To ensure exactness of detail, one-ninth of this surface is plotted on a 2½ foot square.

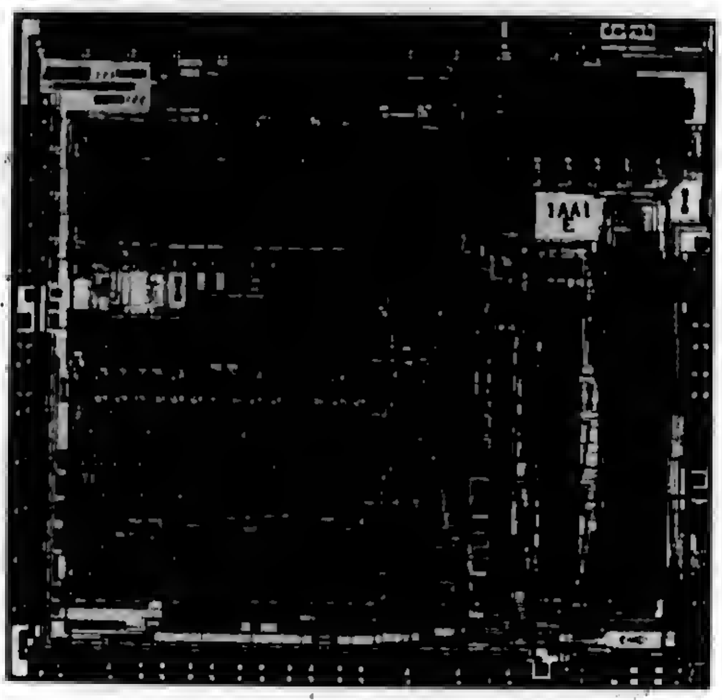
Precision in miniature

In sophisticated integrated chip design, precise measurement and fast throughput are critical for producing mask level artwork.

In our LSI lab, a technician uses a computerized digitizer to produce artwork for the masks of a new chip. Masks are glass plates, each containing the details of one of the chip's eight thin layers.

The technician then loads data corresponding to that particular drawing into the plotter system. Each line is plotted in one of four colors, depending on the material shown.

The finished plot is compared to the hand drawing to verify accuracy; then it's on to manufacturing.



An enlarged photograph of the MC^2 Chip.

Hewlett-Packard's MC^2 chip

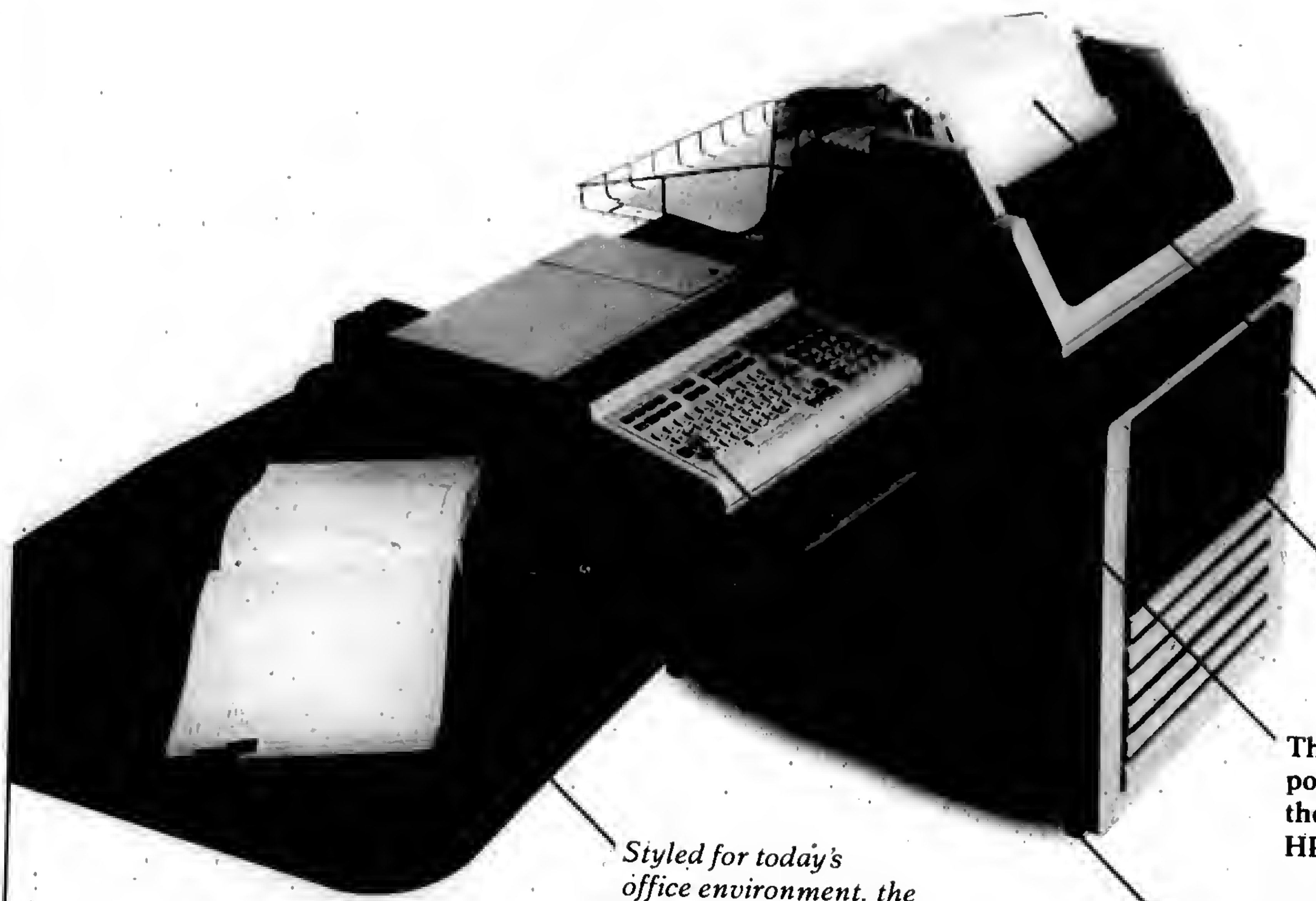
HP's Micro CPU Chip (MC^2) is based on silicon-on-sapphire technology with complementary metal-oxide-semiconductor processing (CMOS/SOS).

With SOS technology, new designs are possible, with far more favorable trade-offs between high speed and low power consumption.

SOS provides superior dielectric isolation, thus circuit elements can be very closely spaced. In only a 34mm² area, MC^2 is a complete 16-bit parallel microprocessor that contains 10,000 transistors.

The MC^2 executes 34 classes of 16-bit instructions and is capable of performing a full register-to-register addition in 875 nanoseconds. Power consumption is typically 350 milliwatts.

Check C on the reply card for more information on CMOS/SOS.



Print typewriter quality reports on standard or custom-designed forms.

Store data on convenient and inexpensive flexible disc memories.

The flip of a single power switch activates the completely integrated HP 9896 desk top computer.

Styled for today's office environment, the HP 9896 has ample work surfaces.

Enter a BASIC program on the keyboard of the high-performance desk-top computer.

The HP 9896 computational system

With the HP 9896, small businesses and first-time computer users have general computational power right at hand, and in their control. Easy to program in BASIC, the HP 9896 has extensive editing capabilities, and programs can be custom tailored to commercial uses: finance, manufacturing, distribution, and sales.

Scientific and engineering applications
The HP 9896 is also a powerful resource for scientific and engineering applications that require analysis and manipulation of technical data in medium-size data bases.

For more advanced applications, the HP 9896 system includes peripheral options—a high-speed (200/1pm) printer and a matrix plotter, for example. You can also expand the memory in increments of 8k bytes up to 32k bytes.

Double density discs
To put more data on-line, HP innovated flexible discs with twice the density of previous industry standards. Each holds nearly 500,000 bytes of information, and as many as four flexible discs can be supported by a system at once, for a total on-line capacity of almost two million bytes.

Full price for the HP 9896 system hardware is $18,700.* HP has an OEM quantity discount schedule. **If you wish further information on the HP 9896, indicate D on the reply card.**

*U.S. domestic prices only

Automate financial accounting in as few as five days*

The HP 9896's new business information management system helps companies with annual sales of $250,000 to $10,000,000 establish their own EDP facility. FICS (Financial Information Control Software) is a complete package of programs to handle general ledger, payables, receivables, payroll, and inventory. Further, HP has an innovative five-day conversion plan that enables qualified* customers to switch over quickly from their manual or ledger card systems.

For larger businesses, the HP 9896 system can also handle selected tasks in such areas as production control, financial analysis, forecasting, and personnel records management.

The Hewlett-Packard customer is assured of a single responsible source. The completely integrated hardware and software package—the HP 9896 and FICS—costs $21,700* and includes installation, conversion, and training. The total system leases for approximately $500/month including maintenance. **To learn more about this advance, indicate E on the reply card.**

*Offer available in the U.S. only; contact your local sales office for more details.

New & Noteworthy

Incremental growth: two Hewlett-Packard products help you grow "byte by byte."

Upward compatible RTE-M

RTE-M is Hewlett-Packard's newest Real-Time Executive operating system for HP 1000 systems and 21MX family computers. Memory-based rather than disc-based, RTE-M is suited for dedicated applications that require fast response time in collecting and controlling data. Minicartridges or flexible discs may be used for program and data storage.

Versatile RTE-M is upward compatible with HP's broad family of larger disc-based systems—RTE II and RTE III. HP lets you choose the system that's right for your present application; and you can expand without high conversion costs or retraining.

RTE-M is available in three modular versions—MI, MII, and MIII—depending on your requirements and hardware resources. RTE-M software is priced at $1750.* **Check F on the reply card for details about RTE-M and RTE II/III.**

DISCoveries

What can be stored on fewer than 100 megabytes of disc memory?
a) The Encyclopedia Britannica from Aardvark to Mustard
b) Enough typed characters to span the Golden Gate Bridge 25 times
c) Materials control and accounting operations of a firm with over 400 employees, 52 products, and annual shipments totaling $42 million.

Guess again. The correct answer is A, B, *and* C. Two 50 megabyte discs offer more memory than you may realize.

Let's visit the company mentioned in "C." Surprisingly, 100 megabytes—the equivalent of two formatted HP 7920 discs—can store much more than the materials control and accounting data bases. There's also system software, applications programs, and plenty of room for growth.

Look at some of the data processed during a typical month:

1200 checks written in accounts payable;
17,000 material vouchers and
4000 labor vouchers processed in cost accounting;
1500 purchase orders and
700 work orders processed in manufacturing;

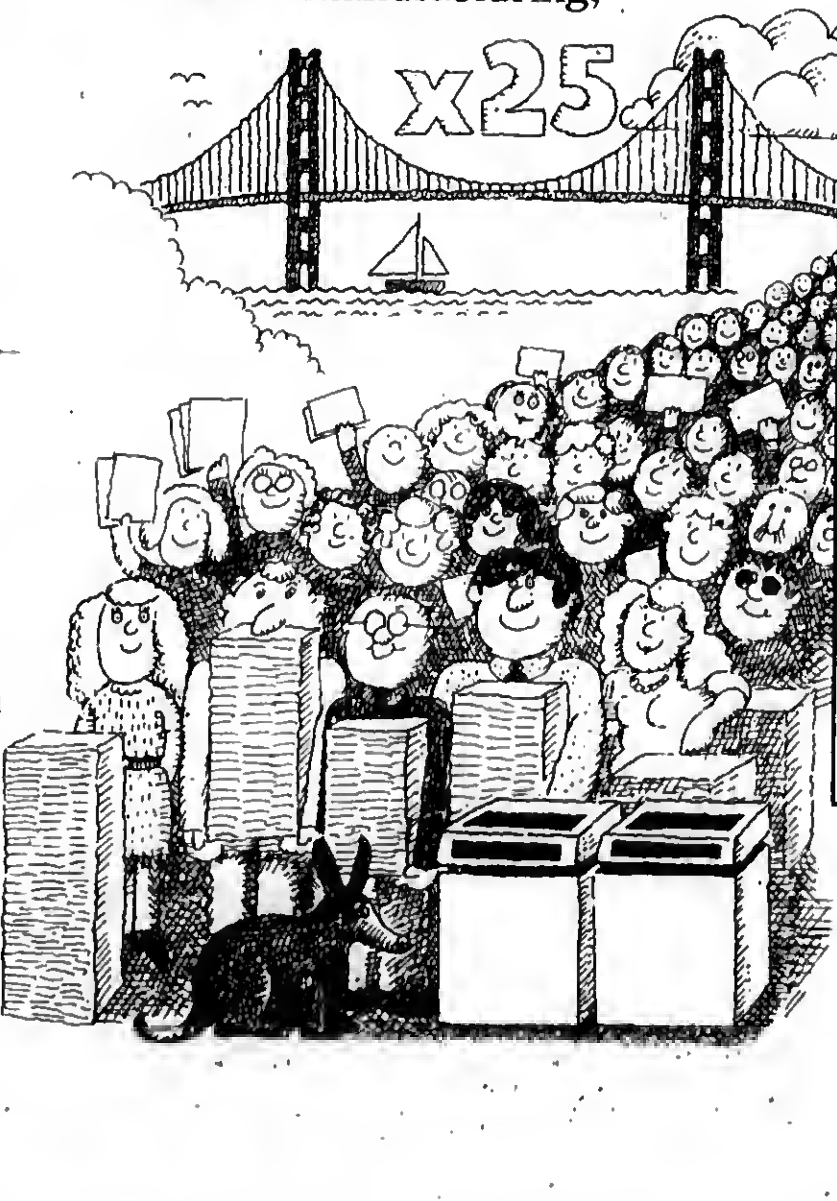
not to mention daily status reports on inventory levels, backorders, and product activity for
5000 different parts.

Remember... all these data, and more, stream from fewer than 100 megabytes.

This company's disc storage is part of an HP 3000 computer system which utilizes the IMAGE data base management package. The HP 7920's function as integral parts of a totally on-line, integrated system, for a current and close-at-hand data base. Six more HP 7920's—another 300 megabytes—can be added to the original microprocessor-based controller for a total of 400 megabytes.

The HP 7920 add-on multi-spindle version is $14,000, or two for $26,000.* **Check G on your reply card for details.**

*U.S. domestic prices only



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E. Automated Financial Accounting	☐	☐
F. RTE-M	☐	☐
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Despite 'Lines/Day' Drop

Univac Team Gains Most From On-Line Programming

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. — It is hard to quantify improvements in programmer productivity attributable to the use of various tools and techniques now available, and improvements don't always live up to expectations. However, the new approaches are worth using, according to Neil Gorchow.

A vice-president for product strategy and requirements at Univac, Gorchow told a session of the recent National Conference on Computer Systems Productivity of a project at Univac in which a combination of tools and techniques were introduced to enhance the programmers' performance.

Overall, the development team did better in many respects than it had when the new approaches were not being used. But, he added, the project still required 50% more effort than had been initially budgeted for it.

Univac, like most vendors and many users, "spends a fortune on software" every year, he said, and this particular project was expected to be substantial, requiring 100 man-months of work.

That estimate took into account gains the company thought it would get from the use of interactive rather than batch-oriented programming environments. It also took into account top-down design and implementation, design reviews, structured programming techniques and the use of higher level language with code reviews.

Determining Effects

The introduction of so many new factors made it slightly difficult to determine the effect of each, but Univac had built up a long file of information about the performance of individual workers on previous projects. This served as a reasonable base for comparison, Gorchow explained.

His notes failed to indicate the nature of the project, but, he said that was relatively unimportant: the estimates were based on whatever the work was to be.

In any case, by the time the project was finished it provided some mixed results — not the least of which was the need for 150 man-months of work to get it done.

The interactive programming environment provided the greatest boost to productivity, he said, perhaps because of the unexpected boost in the development team's morale. In the old batch mode of operation, team members were promised — and generally received — two "shots" a day on the system.

Working at the CRTs, they were free to access the system whenever they wished. By the time the project was done, they averaged four or five shots a day, Gorchow estimated.

Although Gorchow claimed a 20% gain from use of on-line program development, he later mentioned that the "lines of completed code/day" productivity measurement actually dropped on this project from 8 to 6.5. This was confusing to those running the project since they expected the count would go up in the new environment.

But Gorchow gave a clue on what may have happened when he noted the design reviews were "very helpful" because they avoided ambiguity about where the project was headed. Despite the dropback in lines completed, the end product was done sooner than it would have been if the old techniques had been used.

And, Gorchow emphasized, the stability of the finished product was greater than expected — "probably because the end users understood what they had," thanks to the design reviews.

The use of higher level language — Plus, in this case — provided the second greatest improvement in productivity, but the Univac official admitted he was disappointed the gain from this area was only 10%.

Working with the more English-like wording of this coding "drastically reduced errors and eased debugging," he said. "It also divorced the implementation from direct hardware considerations."

The use of top-down design and implementation techniques was the third most significant factor in this project, he continued, noting it "forced a foreknowledge of purpose, forced modularity and minimized integration problems."

In fact, however, the real impact of top-down design and structured programming could not be measured at development time. If all goes well, the payoffs from these approaches will show up more in simplified maintenance than in simplified original coding, he explained.

'JCLMacs' Standardizes OS Job Stream

VALLEY FORGE, Pa. — JCLMacs from Management and Computer Services, Inc. (Macs) was developed as an aid in producing completely standardized JCL statements for IBM OS or OS/VS environments. The ouput is so standardized, "it really is pretty," according to a Macs spokesman.

"Prettiness" is immaterial, of course, but he claimed the standardization is useful as well. It means that systems programmers, for example, can review procedure libraries easily when changes that may affect numerous systems are being considered, he explained.

The package can be run on any computer with enough memory and an ANS Cobol compiler, he said. It will accept OS JCL, utility control cards and JCLMacs cards intermixed to produce output in the same sequence as the input, substituting generated JCL for the JCLMacs cards.

A listing is produced showing each input card and the output generated from it. Errors are indicated by asterisks under the incorrect data and output JCL is formated into a standardized alignment and may be sequenced in columns 73 to 80, the vendor said.

If SORT is specified as the program to be executed, DD statements for all data sets except SORTIN, SORTOUT and SYSIN will be generated by the system, the spokesman noted.

JCLMacs includes a table-driven facility so frequently used JCL can be generated without coding JCLMacs cards. They can be extracted from the table and added to a procedure by a simple reference to its number in the table, he explained.

The package uses 65K bytes in an IBM DOS environment but, since Cobol source code is provided, it should be able to run in any comparably sized CPU that supports Cobol, he added.

The software costs $1,000 from Macs at 790 Valley Forge Plaza, Valley Forge, Pa. 19482.

'Easytrieve' Code Studies SMF Data

OAK BROOK, Ill. — Pansophic Systems, Inc. has begun distributing an SMF reporting system for IMB OS/VS1 users built around Pansophic's Easytrieve package.

The enhancement — free to Easytrieve users — organizes an SMF variable block data base into a "more easily handled" fixed block format, the company said.

The reporting system is made up of five Easytrieve programs that produce the reformatted SMF data base and two more programs that generate daily and periodic reports, including file management information, a spokesman explained. The system deals strictly with Type 4, 5, 6 and 20 SMF records, he added.

The formats provided can be adapted to users' special report headings and various accounting needs. Any job or job step can be singled out for analysis and, since the created file is sequential, it is easy to use.

While the SMF reporting system is available to all current Easytrieve users, it is also ready for distribution to new users of the $15,000 package, Pansophic noted from 790 Enterprise Drive, Oak Brook, Ill. 60521.

Use of Fortran as Source Code Lets DBMS Run on 'Any CPU'

PHILADELPHIA — Seed, a low-cost "Codasyl-type" data base management system (DBMS), was written primarily in Fortran so it could be installed on "virtually all machines," according to the vendor, International Data Base Systems, Inc.

While many DBMS cost so much they must be used across a spectrum of the user's applications, Seed can be justified on the basis of a single application, the vendor claimed.

The $7,500 software includes both a data definition language to specify what goes into the data base and a data manipulation language (DML) to work with the data once it is in place. Seed's DML can be used from Cobol or Fortran programs, a spokesman added.

The system supports network, hierarchical or network data structures providing both schema and subschema views of the data, as defined by Codasyl. Changes in the data or in relationships would require restructuring of the data base, but changes in the user's view of the data can be provided through creation of new subschemas. In either case, existing programs are not affected by changes in the data, he said.

Optional Extension

The DML facility can be extended with an optional interactive interface called DBLook, which serves three purposes. First, it allows the user to build a custom query language to support immediate retrieval of data, the spokesman explained.

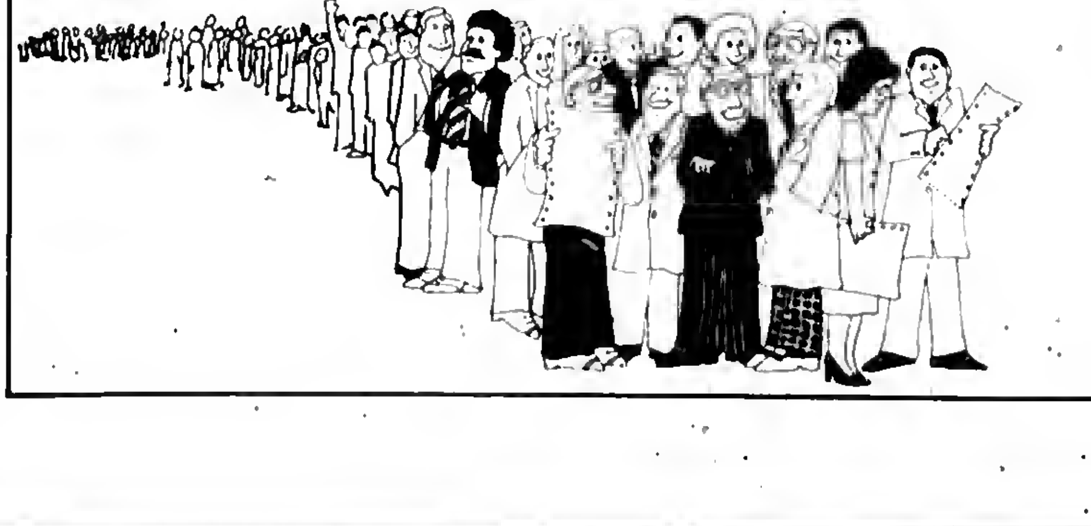
But it also allows the user to examine the structure of the data base itself, to better understand what data types and relationships, for example, are being used.

Finally, DBLook also provides an interactive "HELP" facility to explain commands to the user, he added.

Seed has already been implemented on IBM 370 and Digital Equipment Corp. Decsystem-10 systems.

The basic DBMS costs $7,500 or $375/mo, the vendor said from Suite 252, 3508 Science Center, Philadelphia, Pa. 19104.

Join the more than
1000 DP Managers
now using the
Johnson Job Accounting Report System.



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UK-Built 'Necol' Eases Neat/3-Cobol Conversions

CLECKHEATON, England — The Neat/3 to Cobol Language (Necol) converter developed by Computer Facilities Software Ltd. (CFSL) is now available in this country and will be available in the U.S. once an agent is selected, according to a CFSL spokesman.

The software is said to provide direct disk-to-disk conversion of source programs written in NCR's unique Neat/3 language, recoding them in code compatible with the 1974 ANS specifications for Cobol which can then be compiled on NCR's 8000 series or Criterion CPUs.

While conversion is under-way, Necol produces a source listing of the Cobol statements being produced. Any Neat/3 statement that cannot be converted is identified on the listing and carried to the new Cobol program file as a comment line, so the user can see what work still has to be done manually.

Nonconversion occurs particularly when Necol encounters "Level 2" instructions, the RELINK tag and chained disk files, the spokesman noted, since there are no corresponding Cobol facilities for these Neat/3 capabilities.

In addition, he said, all printer records, work areas and WRITE statements must be recoded by the user because of differences in Neat/3 and Cobol handling of such things as spacing before or after printing.

PERFORM statements "must be closely reviewed" because of differences between that Cobol instruction and the Neat/3 LINK. Numeric literals are converted with enclosing quotation marks which must be removed in Cobol, he added.

More information about the software or about the agency arrangement the company would like in the U.S. is available from CFSL, Braemar House, Snelsins Road, Moorend, Cleckheaton, West Yorkshire, England.

More Cobol Soon

DAYTON, Ohio — NCR Corp. has released an ANS Cobol 74 compiler for use with the N-mode models of its 8000 series CPUs. Comparable compilers for I- and V-mode processors were released earlier so there is now Cobol compatibility throughout the series, a spokesman noted.

Other compilers available with the 8000 series include Neat/3, Neat/VS, Fortran, RPG and Basic.

Systems accommodating the NCR Century Software (NCS) Cobol 74 compiler include the N-8350, N-8450 and N-8500 configurations, as well as the older Century systems, the spokesman said. The minimum system required for the compiler is 32K bytes of memory, printer, two disks and card, tape or cassette input unit.

The N-mode Cobol compiler will be available soon for a monthly license fee of $90.

'Alice' Shifts CICS Macros to Command Format

HAWTHORNE, N.J. — Designed to help convert the macro-level coding required by earlier releases of IBM's Customer Information Control System (CICS) to the command-level mechanisms available under CICS/VS Release 1.3, the Application Language Interface Conversion and Extension (Alice) system has been introduced by On-Line Software International (OSI).

The software works as a batch mode precompiler run. It accepts the user's Cobol source program as input and generates a new source program updated in the way it interfaces with CICS but undisturbed in its basic logic, according to an OSI spokesman.

The macro coding is converted to command-level instructions whenever possible, he said, and when a change cannot be made — some of the macros have no equivalent in the new command structure, he noted — the remaining macros are flagged on the program listing which is also generated.

'Leaving macros in place does not affect the program since CICS 1.3 accepts them as easily as it accepts the command formats, the spokesman claimed. The changeover is made, when possible, primarily for the convenience of the programmer, he said.

Obviously the conversions could be done manually, he admitted. By putting Alice to work however, an installation's entire conversion can be handled quickly and uniformly, he claimed, relieving the local staff of the effort and the need to maintain two different environments, as would be the case if manual conversion took a lot of time.

Alice will be available Aug. 1 for $750, but requests for the package received prior to that date will be discounted 20%, OSI said from Suite 208, Software Plaza, Hawthorne, N.J. 07506.

NOVA/ECLIPSE/PDP-11 Users

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WANG

'SAS' Eases Load Module Chores

RALEIGH, N.C. — Release 76.5 of the Statistical Analysis System (SAS) software is said to provide "substantial savings" for IBM OS/VS users that need to copy load module libraries to disk or tape. The PDSCOPY procedure eliminates the need for relinking and provides reblocking as it copies, according to the SAS Institute.

SAS is a unified system for data management, statistical analysis and report writing, a spokesman explained. The PDSCOPY feature can save users 13% to 18% over conventional methods of copying load modules, he claimed, adding it would be of immediate use to installations upgrading to IBM 3330 or 3350 disk packs.

The updated system also supports tape-based SAS data sets, time and date functions and a procedure to produce overprint contour plots. A format procedure to print value labels and statistical procedures for outputting selected percentiles and for performing one-way non-parametric analyses are also part of Release 76.5, the spokesman said.

Written in Assembler and PL/I, SAS runs in batch or TSO modes or in autobatch under Hasp and requires a user region of 150K bytes. It can be used on IBM 360/370 or plug-compatible machines.

The software is available as a one-year renewable lease with a first-year cost of $2,500.

The SAS Institute can be reached through P.O. Box 10066, Raleigh, N.C. 27605.

'Reccon' Monitors Data Base Duplicates

LEXINGTON, Mass. — The Reccon package enables users working with data base management systems or central information files to recognize and consolidate duplicate accounts, according to the vendor, Systems Design & Implementation, Inc.

Many organizations, including banks and hospitals, may wish to allow separate accounts to cover separate types of services, for example, but still maintain centralized awareness of all accounts that pertain to one person or customer. Reccon supports that need specifically, a spokesman said.

In reviewing files, the package identifies those customer names and addresses most likely to be duplicates. They are displayed to a clerk with an "optimum choice" selected by Reccon based on both account and customer identification data.

Typically, the clerk needs to make a different choice in only 15% of the cases, the spokesman said.

Reccon is written largely in Cobol and runs in "about 100K" on IBM gear, but has been installed on Burroughs and NCR mainframes as well, he added.

The software costs $30,000 plus installation charges the first year and $12,000/year after that. Installation charges generally are about $6,000, the company said from 20 Lillian Road, Lexington, Mass., 02173.

Linear Programming Extended on UCS Net

KANSAS CITY, Mo. — Two linear programming systems — the Advanced Linear Programming System (Alps) and Transportation, Allocation or Distribution (Trad) — are available through the Uninet remote-computing network of United Computing Systems, Inc. (UCS).

Alps applies to production scheduling, investment analysis, industrial management, process control, capital planning and task allocation problems in which any or all the variables may be restricted to integer values.

Trad was designed for optimizing industrial processes involving the transportation, allocation or distribution of products, UCS' business/financial product manager said from 2525 Washington, Kansas City, Mo. 64108.

'DCS' on First Data Net Aids Study of Mechanisms

WALTHAM, Mass. — The Dimensional Computation System (DCS) now available on First Data Corp.'s remote-computing network makes mathematical models of "almost any kind of two-dimensional mechanism or assembly of parts," according to a spokesman.

The system includes a language for describing how the parts of assembly are attached to one another. The important features of the individual parts are also described in a very simple way, relieving the user of having to do any arithmetic or trigonometry, he added.

Headquarters for the nationwide First Data network is at 40 Second Ave., Waltham, Mass. 02154.

Fortran Tests Offered

User Involvement Called Key to Compiler Validation

By Edith Holmes
Of the CW Staff

DALLAS — Validation services and standards for software must go right down to the user level or they won't do any good, Patrick M. Hoyt of the Federal Cobol Compiler Testing Service told a recent conference audience here.

In an effort to encourage users to participate in a developing Fortran compiler validation system, Hoyt offered to test any compiler a user sends him for conformity to American National Standards Institute (Ansi) specifications.

Software standards are the only reasonable means of bringing down software conversion costs, Hoyt believes. "Standards issues have to be hit hard — by users" if the community is to put an end to dumping huge amounts of money down the conversion drain, he stressed.

The Navy's Fortran validation program measures a compiler's conformity to Ansi's 1966 Fortran standard, X3.9, he noted. That standard is currently under review by the voluntary body's Fortran standard committee and users will soon have another opportunity to comment on the 1977 update of X3.9, Hoyt said.

Procurement Aid

Containing Fortran programs, subprograms and an executive routine, the validation system is intended to help the government procure standard Fortran compilers in hopes of developing interchangeable programs which would, in turn, reduce expensive system conversions, Hoyt explained.

Hoyt believes the validation service has already proved to be "a useful procurement tool." And the improved performance of Fortran compilers will enable the programs produced by them to make the jump from one machine to another more easily, he said.

"If vendors tested their software adequately, we wouldn't need to run the validation service," Hoyt stated. "We could accept programs and compilers on blind faith."

Vendors' cooperation in testing and debugging their software has improved since the government began its validation services, first in Cobol and now in Fortran, Hoyt added.

In constructing its validation system for Fortran, the Navy concentrated on writing "positive tests," he assured his audience. The service is strictly a syntactic and semantic test of the language elements contained in and defined by the Ansi standard.

The service's information tests were initiated to be of help to users. The system tests neither vendor extensions of the Ansi specifications nor compiler or object code efficiency, Hoyt stressed.

Basic Service Coming

The Navy has gained considerable experience in running the validation services designed so far. A system for Basic is now in draft form and will be available in the near future, he indicated.

While he chastised users for their lack of involvement in software standard-setting, Hoyt praised Ansi's Fortran committee for its dedicated work in the last 11 years. The National Bureau of Standards (NBS) has also made considerable contributions in the area of federal standards, he noted.

NBS might also take the lead in developing "a federal charter for Fortran validation," Hoyt said. "We need to put teeth in our message to vendors to end the nonconformity problems and outright errors of Fortran compilers and programs."

Ansi is likely to charge $15 a copy for its forthcoming draft revision of the 1966 Fortran stan-

(Continued on Page 36)

Correction

The Fortran program developed to calculate the economic thickness of industrial insulation [CW, June 13] costs $60, according to a spokesman for the Thermal Insulation Manufacturers Association, 7 Kirby Place, Mt. Kisco, N.Y. 10549.

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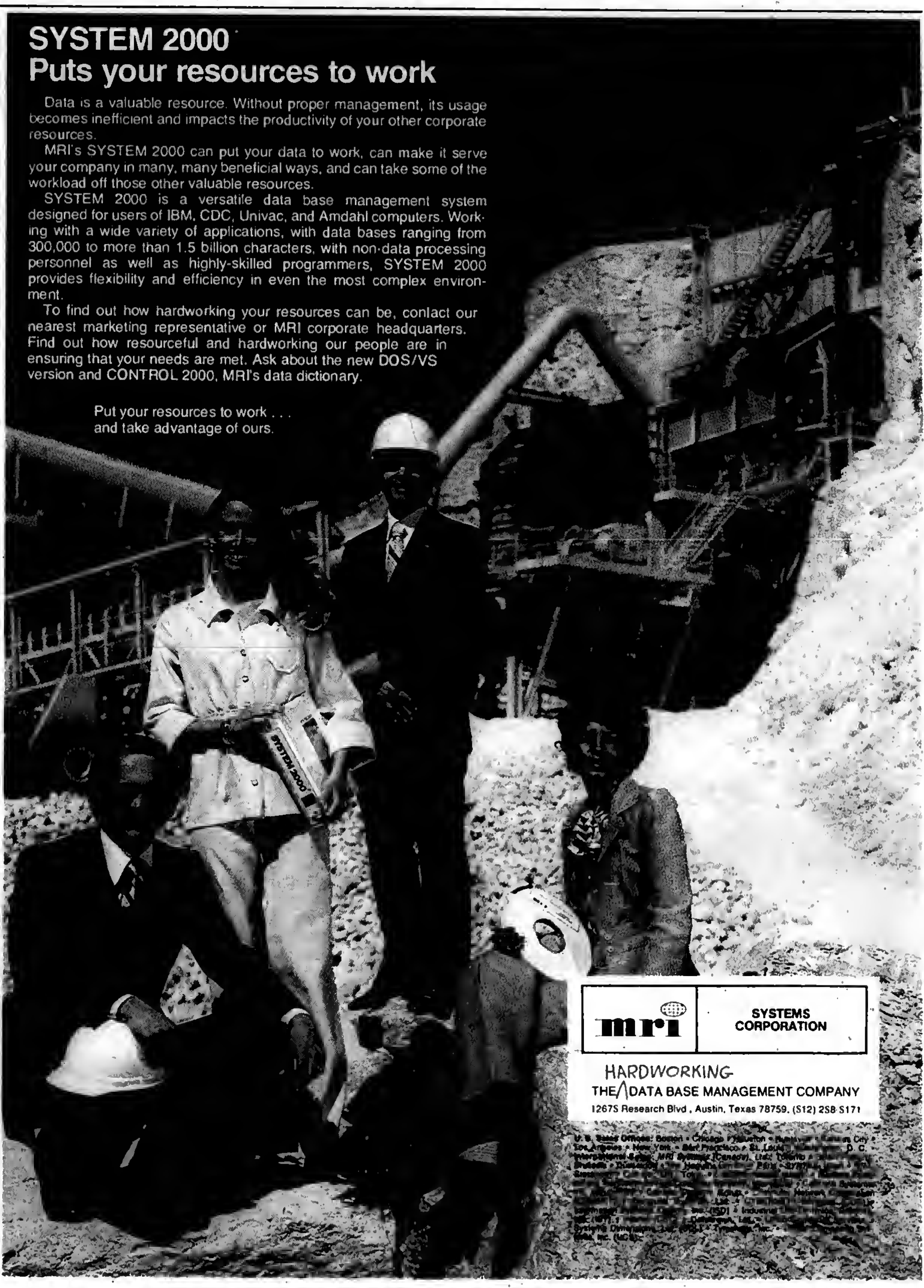

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Measurement Can Be Based on Local Needs: Stimler

By Ronald A. Frank
Of the CW Staff

PHILADELPHIA — The difficulty in measuring the performance of a DP system comes from the lack of an accepted standard of measurement, according to Saul Stimler, president of Stimler Associates.

Productivity or performance measurements must be geared to individual systems; it is up to the user to first decide what given workload is to be expected from the system, Stimler said here recently.

After that, he noted, there is a guideline against which to measure whether the desired results are being achieved.

The workload of a typical DP system is usually based on the amount of work it can and should complete in any given work day and its ability to complete individual jobs in a timely manner, he pointed out.

It is best for the user to establish a representative workload that can be an expected mix for a given day. This should include a multiple mix of transactions processed by the system and take into account traffic peaks, Stimler said.

"Since there is no universal unit of work, you can only relate a certain workload to a specific system," he added.

To determine the maximum limit of a system, it is usually possible to calculate the maximum jobs per hour that can be handled to meet the required turnaround time. Once this has been determined, the user will have a good idea of which part of the system will be the first to become deficient, he said.

Stimler said that monitors, both hardware and software, are tools for the user to determine how much of the total available resources is being utilized at a given point. This process will also help to determine which resource will become saturated first if the system keeps running similar job mixes, he added.

The goal of performance measurement should be to find methods by which the system can do the same amount of work in less time; alternatively it should provide answers on who the system can take on new tasks in the same time, Stimler said.

Meeting these goals means the user is optimizing the performance of his system, he stressed.

The user should carefully analyze the system before beginning a measurement project. A common dictionary of terms should be agreed upon so there will be no semantic differences, Stimler suggested.

It is better to call these common terms a tentative glossary rather than referring to them as a standard — simply because persons become hesitant to accept anything that is labeled a standard, he advised.

In a typical medium-scale installation, a three-person staff would be required to do a performance measurement operation. This should include one manager that can communicate with corporate representatives and two technical persons, Stimler said.

One of the latter should understand how the firm conducts its business because this is important to a successful analysis of the DP methods employed, he added.

The group should make an estimate, which sometimes is little more than a guess of how much system improvement can be attained. After that the assumption should be tested to see whether it is realistic, he said.

Performance people are still suspect wherever they go and whatever they do, Stimler said, but DP costs are a significant part of company budgets, so performance improvement is still very worthwhile.

Help Wanted

REXDALE, Ont. — The Canadian Standards Association (CSA) Committee on Programming Languages is trying to determine the need in Canada for standards on RPG-II and PL/I.

People with experience in these languages and managers of DP installations using them are invited to make their views known, a spokesman said.

Anyone willing to serve on a committee and take part in the standards work should contact H.Z. Rogers, Standards Administrator, CSA, 178 Rexdale Blvd., Rexdale, Ont M9W 1R3, Canada.

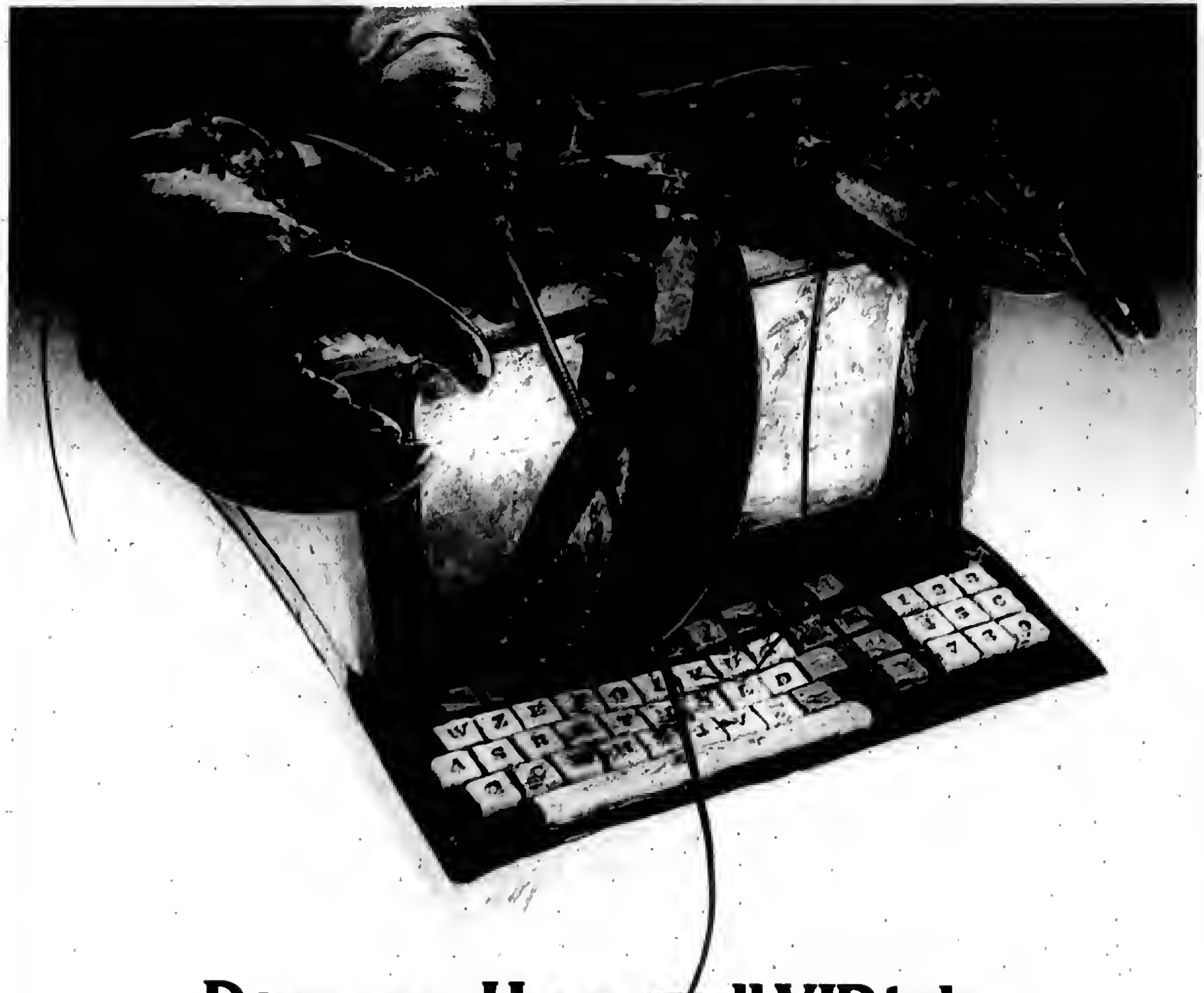
Service Offers Fortran Tests

(Continued from Page 35)

dard, Hoyt noted. The standards body is "petrified that users will participate in the comment period and delay the standard," he said, "but user participation is crucial."

Another area demanding attention is the creation of standard language interfaces to data bases, Hoyt stated. Again, the impetus behind this move is cost.

Users sending their Fortran programs and compilers to Hoyt for testing should include all the documentation they have on the software and address it to Patrick M. Hoyt, Federal Cobol Compiler Testing Service, Department of the Navy, Washington, D.C. 20376.



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Data Briefs

Fiber-Optic Communications Subject of Free Booklet

W. BOYLSTON, Mass. — The raised floors in computer rooms and error-checking hardware and software may become things of the past through the use of fiber-optic cables, according to a booklet from Valtec Corp. here.

"An Introduction to Communication Fiberoptic Design" is a 20-page illustrated text prepared and authored by the manufacturer's staff engineers and scientists.

The publication provides a brief history on the subject of fiber optics, presents the advantages of the light medium and briefly discusses initial costs, hardware savings and typical applications.

The introductory brochure is available free of charge from Valtec's Fiber Optics Division in W. Boylston, Mass. 01583.

Tau-Tron Adds Generator

N. BILLERICA, Mass. — Tau-Tron, Inc. has added a UHF data generator to its TMI product line for testing communications networks.

The MG-15 is a quarter-size plug-in module providing a serial data output at clock rates up to 500M bits, according to the company.

Programming is accomplished by front-panel toggle switch operation; the word length can be selected to either 15 or 16 bits.

The MG-15 sells for $3,300, a spokesman noted from 11 Esquire Road, N. Billerica, Mass. 01862.

Norland Has Data Analyzer

FORT ATKINSON, Wis. — Norland Instruments has announced the availability of the 2001A/6500, a 100-mHz waveform and data analysis system.

The system is comprised of the Norland 2001A data analyzer and the Biomation, Inc. 6500. It can capture signals at acquisition rates up to 500 mHz with 6-bit resolution, Norland stated.

The system costs $33,995, a spokesman noted from Rte. 4, Norland Drive, Fort Atkinson, Wis. 53538.

UDS Registers DAA

HUNTSVILLE, Ala. — Universal Data Systems, Inc. (UDS) has introduced the 1001F Data Access Arrangement (DAA) that conforms with the Part 68 long-form registration process of the Federal Communications Commission (FCC).

The 1001F has an RS-232C interface, can withstand up to 100m amps of dc line current and features automatic overload protection, UDS said. It costs $145 from 4900 Bradford Drive, Huntsville, Ala. 35805.

Told to Circumvent Restrictions

Multinationals Given Grim View of Overseas Nets

By John P. Hebert
Of the CW Staff

DALLAS — Data communications managers in multinational corporations that plan to implement or expand overseas networks might have to circumvent the physical and political hornet's nest of restrictions awaiting their efforts, two representatives of U.S.-based multinational companies and a British consultant on multinational communications stated at a recent conference here.

The problems include political restrictions on the type of data sent across national lines, restrictions on any data being transmitted, incompatibility of communications hardware and software and economic hindrances — compared with the relative ease of implementing a network in the U.S., the three panelists agreed.

The two major problem categories users will encounter overseas are regulatory restrictions and tariffs imposed by the government-run communications carriers and their resulting high costs, according to David Hebditch, a consultant with Expertise International in England.

A voice-grade leased circuit between Frankfurt, Germany, and Brussels, Belgium — a distance of only 180 miles — costs $20,000 per year, Hebditch said. A 200-mile link between London and Amsterdam costs about $15,000, while a voice-grade circuit between Geneva, Switzerland, and Stockholm, Sweden costs $35,000 annually.

In the U.S., however, 180-mile leased voice-grade lines cost $1,000 each for the first two and $2,000 for the third, he noted.

The cost of overseas services is exorbitant because they cross national boundaries and because the European Postal Telephone and Telegraph (PTT) authorities are "money-hungry organizations" that are short of capital, Hebditch said. Illustrating this last point, he pointed out that leased voice-grade lines between London and South Africa cost $160,000 each year, for example.

The cost of the same type of link would cost users $100,000 annually if the communications were routed differently to bypass "a certain country in Europe," he said.

When implementing a communications network in Europe "be well advised by somebody [there] because it will save you an awful lot of money," Hebditch urged.

Long Lead Time

James Hale, manager of corporate DP planning for the Coca-Cola Co., also advised users to make use of services provided by the major international record carriers located in the U.S. The only problem with this approach, he added, is finding the person or people qualified to identify and discuss the major pitfalls.

It is much easier to transmit data from the U.S. to overseas locations than try to transmit between two adjacent countries overseas, especially between developing nations, Hale said.

The Coca-Cola conglomerate was quoted a lead time of 18 months to install a leased line between Johannesburg, South Africa, and Kenya. In addition, the company was informed the carrier could not guarantee a constant transmission speed on the link once it was established and, if a failure occurred during the rainy season, the mean time to repair would probably be eight weeks, Hale explained.

Dedicated Mini

The company circumvented this situation by placing a dedicated minicomputer in Kenya rather than transmitting information from a terminal to the CPU in Johannesburg, he noted.

Another way to bypass such obstacles, Hale continued, is to use an International Telex service, but even that, too, poses restrictions for the user. It is possible to use the service through a Western Union International domestic switch to make the different transmission codes compatible, he added.

Packet switching will be the best answer with the most promise for the low- to medium-volume international user's needs

(Continued on Page 38)

List of IBM-Compatible Hasp Workstations Grows

●Comten 7780, 7781 Debut

ST. PAUL, Minn. — Comten, Inc. has introduced two IBM 360/20-compatible Hasp multileaving workstations designed to work with Comten 3650 and 3670 Communications Processing Sytems (CPS).

In its basic form, the Comten 7780 consists of a 600 card/min Comten Model 7305 reader and 600 line/min Model 7406 printer. The 7780 also offers its user the option of sharing a Model 4008 system console for operator communications, according to the company.

The 7781 batch terminal workstation, which includes the card reader and the line printer, also has its own dedicated Model 4008 operator console.

Either configuration can be expanded to include up to six additional card readers and six more line printers. Workstation control can be provided by adding a multileaving adapter module and a multileaving workstation emulator to existing network control software, Comten said.

Sharing the resources of the Comten CPS reportedly eliminates the need for separate remote batch terminal control hardware.

All of the Hasp software for the workstation resides in the CPS. Network control procedures for full-duplex communications are supported on the remote CPS, according to a spokesman.

The 7780 costs $29,000 or $1,110/mo and the 7781 is priced at $32,500 or $1,256/mo in its basic form. The CPS ranges from $50,000 to $125,000, depending on configuration.

The workstations are scheduled for delivery by mid-September, the spokesman noted from 1950 W. County Road B-2, St. Paul, Minn. 55113.

●Raytheon Enhances PTS-1200

NORWOOD, Mass. — Raytheon Data Systems Co. has introduced a software enhancement which allows its PTS-1200 distributed processing system to perform the functions of IBM 360/20 remote job entry workstations.

In addition, the company added a security badge reader to its PTS-100 series of programmable terminal systems.

PTS-1200 enhancement permits Raytheon users at remote sites to communicate with such IBM spooling programs as Hasp, ASP and JES while concurrently interacting with the host on a transaction basis under IBM 3270 protocol and performing a variety of local tasks, according to Raytheon.

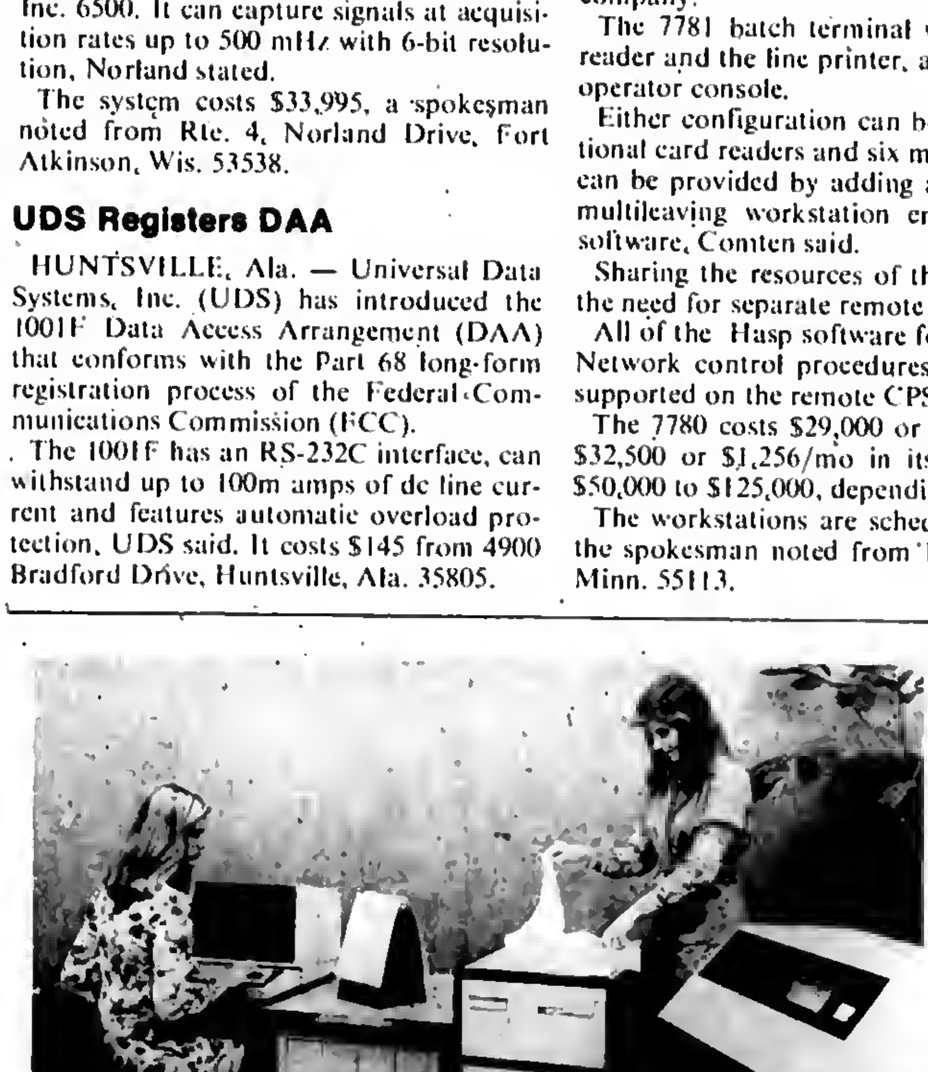
The workstation capability allows PTS-1200 users to access the capabilities of a host mainframe regardless of the mainframe location. Through commands entered from a system console, users can control the I/O operations of multiple remote peripheral devices, the company claimed.

Punched card data or data keyed onto disk or tape from PTS-1200 CRTs can be transmitted to a host and entered into the host system queue, with processed data returned to specified devices under control of a set of utilities written in Raytheon's Macrol programming language, according to the firm.

PTS-1200 terminals with the enhancement can handle both batch and interactive communications jobs. Terminals on the same system can handle both of those jobs at the same time, while other terminals are used to enter data, validate data, inquire into local files or initiate local processing jobs, a Raytheon spokesman noted.

The Raytheon systems support Binary Synchronous Communica-

(Continued on Page 38)



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Data Trap Features Micro, CRT Monitor

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has introduced the Hawk 4000, a microprocessor-controlled data trap with a CRT monitor to help diagnose data communications problems.

The company also brought out two additions to its Series 8500 Minitech product line; the 8508 audio generator and monitor and the 8554 selector switch and monitor module.

The IDS Hawk 4000 Datatrap can interactively transmit and receive data between a modem and a terminal and display the data on a 9-in., 512-char. screen, according to the firm.

A total of 2,000 characters can be trapped and stored for later recall and study, IDS added.

The Hawk operator issues commands using a 16-key alphanumeric keyboard. All switches are stored in memory, the firm stated.

The monitoring system can operate with Binary Synchronous, Synchronous Data Link Control, Higher-Level Data Link Control and all Advanced Data Communications Control Procedures protocols, according to the company.

It handles full-duplex, asynchronous transmission rates from 75 bit/sec to 19.2 kbit/sec and synchronous speeds to 75 kbit/sec. Transmit and receive data can be displayed interleaved by character, by row or on a split screen, IDS stated.

Ascii, Ebcdic and hexadecimal formats are standard in the Hawk, which IDS said costs $9,975.

The Model 8508 audio generator and monitor reportedly allows its operator to listen to and acurately measure received analog signals appearing at the modem/-telephone line interface.

The unit generates a 1 kHz tone, variable from 0- to -16 dBm, which can be patched into a telephone line to determine line losses, IDS stated.

The IDS Model 8554 is a four-position selector switch and monitor module which reportedly allows the user to select any one of four 25-wire RS-232 interfaces.

The 8508 audio generator is priced at $810, or $730 for a rack-mounted version; the 8554 switch costs $255, IDS said from 100 Nashua St., Providence, R.I. 02904.

Develcon Modem Transmits 20 Miles

SASKATOON, Sask. — Develcon Electronics Ltd. has introduced the DS513; an asynchronous limited-distance data set.

The DS513 was designed for operation over metallic twisted-pair cable at speeds up to 9,600 bit/sec and distances up to 20 miles.

Transmission speeds up to and including 4,800 bit/sec can be achieved over loaded cable, according to the firm.

Typical operating distances on 26-guage cable is six miles at 9,600 bit/-sec, 10 miles at 4,800 bit/sec, 17 miles at 2,400 bit/sec and 20 miles at either 1,200- or 300 bit/sec, Develcon said.

Develcon's limited-distance data set costs $275 from the firm at 108 103rd St. East, Saskatoon, Sask. S7N 1Y7, Canada.

Multinationals Told About Overseas Nets

(Continued from Page 37)

because of the incorporation of standard protocols, Hale said. Packet switching will be first used in England, then France and Germany, he predicted, adding it would he a long time before it shows up in the developing nations.

Those contemplating the implementation of communications networks overseas are concentrating too much on the technical aspects of data communications rather than on the other aspects of multinational transmission, according to Janusz L. Madej, manager of international systems for Clark Equipment Co.

Implementation Aspects

The important implementation aspects of such multinational systems, Madej said, are the diffetent vendors, rates, equipment, languages and subsidiary companies.

But the legal aspects of implementation are possibly the most important, he noted. "Be very careful about the information which you are sending abroad, or it could be subject to government investigation," Madej warned. Data scrambling may be necessary to bypass the PTTs, he said.

In addition, multinational networks should be part of the corporate management function. The network's function is to help manage and control the company, to help provide competitive services and to realize economies of scale, Madej said.

The networks also tie the corporate system with each overseas system to achieve consolidation for order placement, acknowledgement of received information and updating of local data bases, he noted.

Users should ask themselves "What is the function of the network?" rather than "What is the data which will be transmitted?" before they decide to install a network overseas, the speakers agreed.

PTS-1200 Enhanced As Hasp Workstation

(Continued from Page 37)

tions with mainframe spooling programs over leased lines or manually switched, half-duplex dial-up networks at speeds up to 9,600 bit/sec, he added.

The PTS-1200 handles data compression and supports multileaving, which permits several files to be simultaneously transmitted and received. With the enhancement, the processor supports four input and seven output streams in addition to the system console stream, Raytheon said.

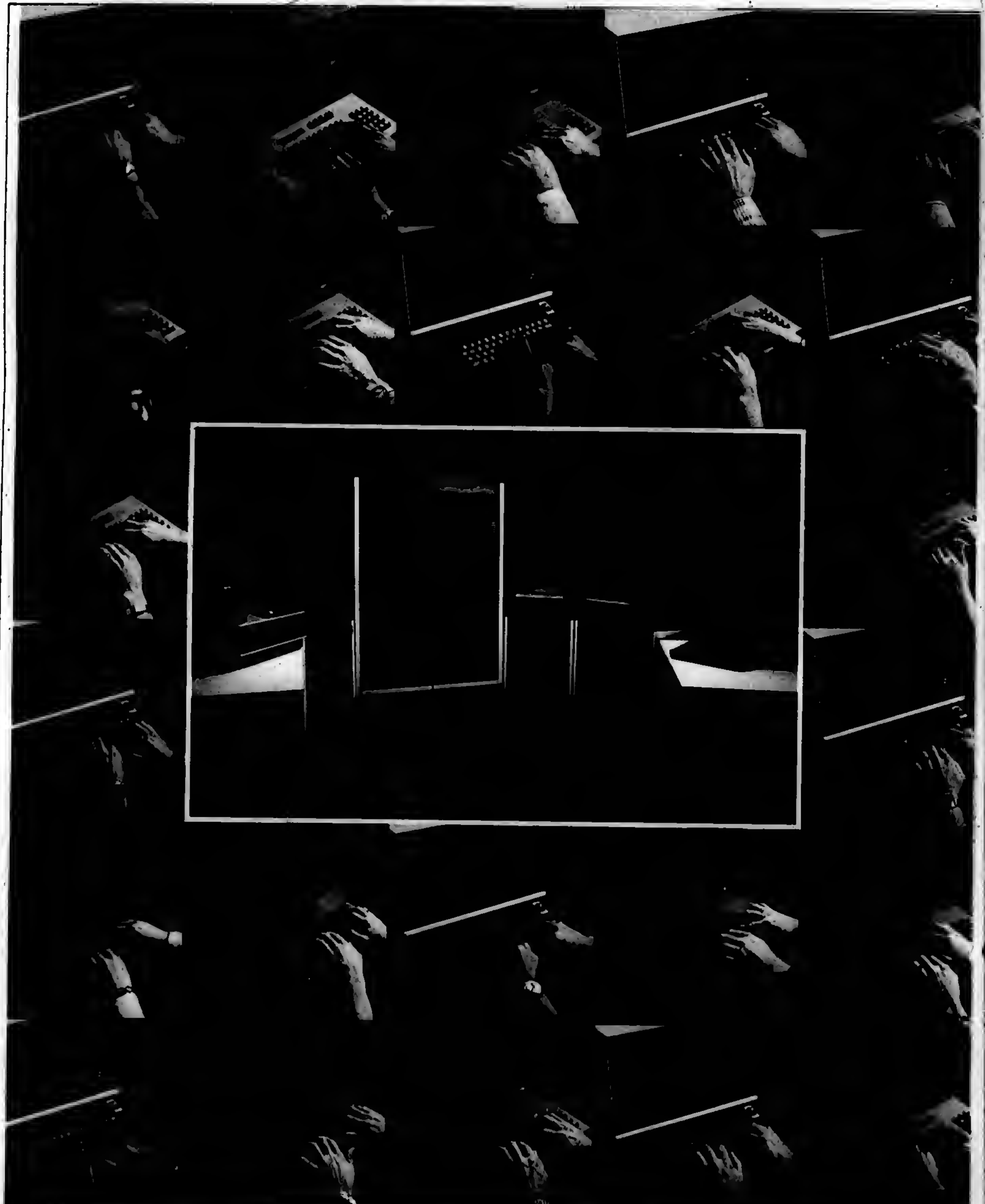
The software needed to support the 360/20 workstation enchancement is available without charge, the company added.

Badge Reader Bows

The Model 6140-01 security badge reader allows PTS-100 system users to restrict access to individual keyboard display terminals and/or applications programs and to restrict access from PTS-100 terminals to a host computer, the spokesman stated.

The device decodes up to 14 digits of numeric information contained on perforated cards the size of standard credit cards.

The security badge reader sells for $750 or rents for $26/mo. Raytheon is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.



MCI's Telemanagement Optimizes Phone Call Routing

CW Photo by R. Frank

Tom Richter, MCI's Dallas operations manager, enters data into Danray computerized switch using CRT.

By Ronald A. Frank

Of the CW Staff

DALLAS — A computerized switch is helping MCI Telecommunications, Inc. offer a service that optimizes phone call routing for business users to minimize their monthly phone bills.

Called Telemanagement, the MCI service provides users with optimum routing for calls and provides users with optimum routing for calls and provides complete monthly billing statistics for charge-back and other cost-accounting procedures.

The MCI service is available in six cities now, but plans call for expanding it to 37 cities by September, according to Gerry Taylor, vice-president in charge of the southwest region.

Telemanagement was designed to be used by any customer who has a phone bill of $5,000/mo or more, Taylor said. When a customer utilizes the service, his in-house switchboard is connected to the Telemanagement equipment at the MCI terminal location.

In Dallas, the company uses dual Danray, Inc. CTSS 1000 switches. Each contain dual Keronix, Inc. minicomputers which monitor call information and provide statistics on traffic to the user.

The Keronix CPU (only one is used with the other as backup) enters the traffic information onto a disk subsystem which contains 10M bytes of storage, according to Tom Richter, Dallas operations manager.

The Danray switch also includes a tape drive. Some customers are given monthly phone traffic information on tape (instead of a printout) which is then ready for processing on their in-house mainframes, Taylor said.

Handles Voice, Data Calls

Telemanagement can handle both voice and data calls depending on user-specified priorities. In some cases, if a customer wants his data transmitted without delay, such calls are given preference by the switch and are connected regardless of whether there are other calls waiting for line facilities, he said.

Customer switchboards are connected to the MCI terminal location by phone company local loops, and as part of the Telemanagement service all lines are checked for operational status each morning, Richter explained.

Also included in the Danray equipment is a Cognitronics Corp. audio response system. When a calling user is held in a queue because all facilities available to his line are in use, the processor will activate an audio message explaining the situation.

Customer priorities can be modified as necessary and a CRT or teletypewriter is available to MCI operations personnel to update instructions to the system.

The Telemanagement service currently handles calls for about 125 customers and there is a waiting list of those who want to be connected in the various cities, Taylor said.

Typical Charges

A typical call placed on the MCI service costs about 18 cents to 22 cents per minute depending on the typ~~e of line~~ facility used. By comparison, a dial-up call on the telephone net costs about 40 cents per minute, Taylor noted.

The lower cost can be attributed to optimizing the use of Wats, foreign exchange and other types of lines, he said.

Typical savings for users of the Telemanagement service can range from 30% to 40% of existing monthly phone bills depending on the number of lines and types of facilities used, Taylor said.

Many of the features available to users of the MCI service are also provided to larger customers of the phone company through its Common Control Switching Arrangement (CCSA) facilities. Telemanagement makes it possible to bring this type of service to smaller users that cannot justify the CCSA capabilities, Taylor said.

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Micral CRT From R2E Has 24K-Byte CPU

ORSAY, France — R2E, a French minicomputer manufacturer, has introduced an intelligent CRT terminal system designed for DP applications, word processing and automatic typesetting.

The Micral C consists of a 24K-byte processor expandable to 32K or 64K of random-access memory (RAM), a 1,920-character CRT unit and an integrated keyboard station, a spokesman noted.

Two "minifloppy" disk drives offer the Micral C users 160K bytes of data storage for on-line applications. In addition, the terminal system has a parallel printer interface for Centronics Data Computer Corp. printers, he said.

An advanced Business Applications-Oriented Language (BAL) with file management is available with the terminal, as is Fortran and Assembly language.

The terminal costs $8,995. Additional RAM storage in 8K increments costs $395.

The company's U.S. agent, L.H.A. Associates, is located at 8589 Tanglewood Trail, Chagrin Falls, Ohio 44022.

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Micro-Based Graphics Unit

Raster Scan CRT Designed for Novices

PALO ALTO, Calif. — Hewlett-Packard Co. has brought out the HP 2648A, a microprocessor-controlled graphics CRT terminal that utilizes raster scan technology and was designed for users with little or no programming experience.

Although the 2648A was developed for graphics applications, the terminal has the data entry and communications capabilities of the HP 2645A CRT, HP noted.

HP 2648A

The raster scan display/refresh technology reportedly gives the terminal an easily read display and enables users to erase and modify the display selectively without redrawing the displayed image.

This minimizes the user's waiting time and CPU overhead while reducing communications costs, according to HP.

In addition, both graphics and alphanumeric data can be viewed separately or simultaneously because they are stored in separate memories, HP said.

The basic terminal has 8K bytes of semiconductor memory, expandable to 12K, allotted to alphanumerics. Sixteen 16K random-access memories (RAM) provide a 360 by 720 dot resolution for the display of graphics, the company stated.

Terminal Transactions

The CRT displays data in a 24-line format at a density of 80 char./line and in 9 by 15-dot character cells, it added.

Features of the graphics terminal include the ability to zoom and pan the displayed graphics image with one keystroke without the support of a host CPU; a line-drawing capability between any selected point and the cursor; and area shading and pattern generation, according to the firm.

The terminal also can help guide its operator in plotting tabular data and offers automatic plotting independent of the host.

The terminal can be equipped with optional built-in cartridge tape drives to provide 220K bytes of local data storage for on- and off-line applications, HP noted.

The price for a basic HP 2648A is $5,500; when equipped with the cartridge tape drives, the graphics terminal costs $7,100. Deliveries are scheduled for August, an HP spokesman said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Decprinter Gets Serial Interface

MARLBORO, Mass. — Digital Equipment Corp. has introduced a single printed circuit module serial interface for the LA180 Decprinter I.

The interface is available in two versions, for use with either EIA or 20mA current-loop connection. It enables operation of the LA180 with serial output devices and through modem-equipped telephone lines.

EIA operation provides automatic answering capability for unattended operation with Bell 202-type modems or equivalents, DEC said. Both versions convert serial Ascii data to parallel input compatible with the standard LA180 and both are switch-selectable for data rates from 300- to 9,600 bit/sec.

The interface costs $525 from DEC at One Iron Way, Marlboro, Mass. 01752.

SDX Offers Add-Ons For Tektronix 4051

ORANGE COVE, Calif. — SDX, Inc. has introduced two types of add-on memory for the Tektronix, Inc. 4051 graphics display terminal.

SDX's S32K plug-compatible memory system expands the 4051 system memory from 8K to 32K words of main storage through the addition of a circuit board which fits inside the 4051 cabinet, according to the firm.

Tektronix graphics terminals with main memories of 16K or more can be upgraded in 8K increments with the SDX S8K memory expansion kit, SDX noted.

Each memory comes with diagnostic software for system and memory test functions.

The S32K costs $2,395 and the S8K kit costs $495; installation is provided free of charge, according to the company, which can be reached through P.O. Box 41, Orange Cove, Calif. 93646.

AJ Redesigns Model 860 To Meet APL Users' Needs

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has come out with a version of its AJ 860 desktop teleprinter terminal designed to meet the special character set requirements of APL language users.

The AJ 860/A uses a 9-wire dot matrix print mechanism to produce each character in a 9 by 12 cell.

The AJ 860/A costs $3,285 and will be available in the fourth quarter from the firm at 521 Charcot Ave., San Jose, Calif. 95131.

Perkin-Elmer Has Upkeep Plan

RANDOLPH, N.J. — Perkin-Elmer Data Systems has introduced a maintenance plan for users of its equipment.

"No Hassle Service" provides toll-free telephone contact between the user and the company's Central Dispatch.

The service allows certain diagnostics to be run while the customer is on the phone, Perkin-Elmer is at Route 10 and Emery Ave., Randolph, N.J. 07801.

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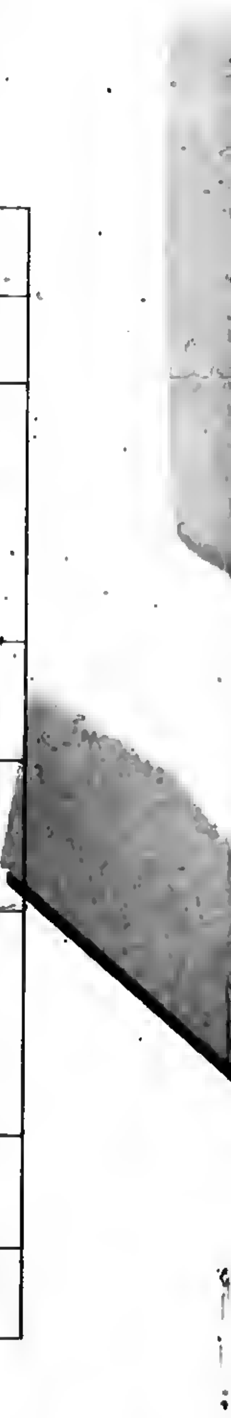
Check the comparison chart of editing terminals to see all the reasons why the OWL-1200 is simply "incomparable."

USER REQUIREMENT	FEATURES	PERKIN-ELMER	HAZELTINE	LEAR SIEGLER		ADDS
		OWL-1200	MOD. I EDITING	ADM-1A	ADM-2	980
High Operator Data Entry Accuracy	Protected fields	Yes	Yes	Yes	Yes	Yes
	Low-intensity fields	Yes	Yes	Partial	Partial	Partial
	Numeric only fields	Yes	Yes	No	No	No
	Inverse video fields	Yes	Yes	No	No	No
	Blink fields	Yes	Yes	No	Yes	Yes
	Line drawing capability	Yes	No	No	No	Yes
Simple, Fast Editing of Data	Insert/delete character	Yes	Yes	Partial[1]	Yes	Yes
	Insert/delete line	Yes	Yes	Partial[1]	Yes	Yes
Minimized Loading on Host Computer	Host programmable send keys: send all data, send only unprotected data, send only data modified by operator, send only a "request to send" header.	Yes	No	No	No	No
Simplified Programming	Ability of host CPU to read device status	Yes	No	No	No	No
	Ability of host CPU to read device mode key settings and communication option straps	Yes	No	No	No	No
	Program override on mode key settings	Yes	No	No	Yes	No
Simplified Program Debugging	Transparent mode permits all characters to be displayed	Yes	No	No	No	No
Cost Effectiveness	OEM price in quantities of 25*	$1496	$1670	~~$1795~~ * $1595	~~$2395~~ * $2095	$1995

*When unit includes editing capabilities, 24 x 80 display, numeric pad, and upper/lower case characters.

[1] No Key. Requires Two Key Code.

* Just announced price changes



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Firm Speeds Job-Costing Chore

Badge Reader Devices Put Timely End to Time Cards

PARAMOUNT, Calif. — The installation of an on-line job-costing system at a manufacturing firm here reportedly has allowed the company to collect and process twice the time-and-material and payroll data in one-eighth the time as the previous manual system.

Lockhart Industries' system is comprised of badge reader terminals from Panasonic Corp. that are tied to a remote Hewlett-Packard Co. HP 3000-II Model 5 minicomputer in Long Beach, Calif.

Lockhart, which employs about 70 people, builds compact heat exchangers for use in airborne and shipboard navigation and guidance computer systems as well as oil coolers for motorcycles and automobiles.

The system collects the time-and-material data for invoicing, accounts payable and receivable and payroll. It was designed by Professional Computer Services, which houses the HP minicomputer.

Data is transmitted to the computer system over leased lines at 300- and 1,200 bit/-sec through Vadic Corp. modems.

Terminal Transactions

When reporting for work, employees sign in hy inserting a plastic badge with their employee number prepunched. This information is sent to the computer over the 300 bit/sec leased lines through Vadic 306G and 307G modems.

When ending a specific job, the production worker again inserts his badge into the Panasonic reader. He also keys in the job number, the subjob if any and the operation he has performed.

The computer verifies that he's a valid employee and that the job and the operation are valid. It measures the time interval and records the amount of time against the job.

Reports show the accumulation of time by workers on each job; this data is also used for the preparation of the payroll.

The system eliminates the need for time cards and manual posting of job-costing and payroll data.

Jobs are set up on the computer, costs other than labor and backlog are entered and output reports are printed using a General Electric Co. Terminet 1200.

The Terminet is located in the Lockhart plant and communicates with the computer system over a 1,200 bit/sec telephone line with Vadic VA1230K modems at each end. Two CRT terminals are similarly linked with the HP 3000.

Now an Hour's Work

According to Bill Pierce, Lockhart vice-president and treasurer, it now takes one person about one hour to do the reports. Before the system was installed — when Lockhart was doing half its present volume — the same reports done manually took one person a full day.

"The system costs about $1,000 a month. Without it, we would need two full-time people to do the same job," Pierce said.

"Also, we're getting much more management information. And the system is so simple that we can train someone to operate it in a couple of hours, which provides a continuity not possible with a manual system," he added.

Bob Goodman, owner of Professional Computer Services, said HP recommended the Vadic modems. "The modems have been very reliable and we're impressed with the diagnostics. For example, using local loopback, we can check out the modems at our computer site.

"Then, by switching to remote loopback, we can test the phone lines and the modems located at the Lockhart plant," Goodman said.

Daily and Weekly Reports

A daily report is printed showing all labor entries by employee for a permanent time record. Exceptions are flagged and the report is reviewed for errors. Corrections and additions are entered each day.

A daily absentee report is printed, as are weekly labor reports by job and by employee to provide an audit trail of all labor entries into the job cost.

A weekly gross wages report by employee is furnished for payroll purposes.

Labor costs are accumulated by operation. Raw material, purchased parts and outside processing are accumulated by purchase order. A complete record of all job costs is maintained.

A summary of costs by job is available showing the direct labor, raw material, purchased parts, outside processing, last entry date and total costs.

Labor costs can be extracted hy operation and subjob. Labor costs per unit are also available. External costs can be listed by purchase order and vendor, with raw material, purchased parts and outside processing segregated.

A backlog file is maintained hy purchase order line item within each job. Invoices are prepared interactively using the backlog file as a source of data. Payments can be coded to apply to the oldest invoices to preclude the necessity for listing individual invoices or to specific invoices.

A data hase management system is also used to allow immediate and easy access to files for inquiry into job cost, employee data and accounting data.

Program changes are simplified by the independence of the programs from the data structure.

Techtran Adds Portable 815

ROCHESTER, N.Y. — The Model 815 Datacassette from Techtran Industries, Inc. is now available in a rechargeable battery-powered version, for data storage and retrieval applications.

The 815 weighs 10 pounds and the batteries are self-contained supplying a minimum of eight hours of continuous operation between charges, according to the firm.

The battery-powered 815 is priced at $1,095 including batteries and charger, Techtran said from 200 Commerce Drive, Rochester, N.Y. 14623.

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Also Makes Price Changes

Burroughs Adds Four Units to Medium, Large Systems

DETROIT — Burroughs Corp. has expanded both its medium and medium-to-large-scale systems with the addition of four models. The firm also announced pricing changes on several other models.

In expanding its B6800 series, Burroughs added two entry-level systems, the B6803 and the B6805, which provide 50% and 60% respectively of the throughput of the firm's B6811, according to a spokesman.

The basic B6803 includes a 5 mHz CPU, a 12-channel I/O processor, 786,000 bytes of 770 nsec error-correcting core memory expandable to 3 million bytes, a maintenance diagnostic processor and an operator console with dual displays. It sells for $299,000 or leases for $8,600/mo on a 12-month lease.

The basic B6805 offers features similar to the B6803 with the exception of memory, which is 325 nsec error-correcting planar memory. The B6805 sells for $360,000 and leases for $10,355/mo on a one-year lease.

Deliveries for both models are scheduled to begin in the third quarter.

The firm also added two top-of-the-line models to its B2800 series, the B2810 and B2815.

The B2810 and B2815 models are object code-compatible with the larger B3800 and B4800 systems as well as with earlier B2700, B3500, B3700 and B4700 systems, the spokesman claimed.

The two models feature an I/O subsystem that offers up to 24 channels, each having its own Data Link processor. The Data Link processor accepts I/O commands and executes them independently of the CPU, he said.

A basic B2810 features a 2mHz CPU, 125,000 bytes of 667 nsec error-correcting MOS memory that can be expanded to 500,000 bytes, an 8-channel I/O subsystem and either a printing or display console. The basic B2810 with 250,000 bytes of memory costs $152,860 or $3,505/mo on a five-year unlimited lease plan.

A basic B2815 is similar to the B2810; however, the CPU operates at 3mHz. A basic B2815 with 250,000 bytes of memory can be purchased for $197,660 or $4,515/mo on the five-year plan. Deliveries are scheduled for the fourth quarter, the spokesman said, adding lease rates for all B2800 and B6800 systems now include around-the-clock field service seven days a week.

Burroughs has also increased the performance of its B6807 up to 60% by incorporating improved memory access logic which enables the CPU to utilize main memory more effectively, he said.

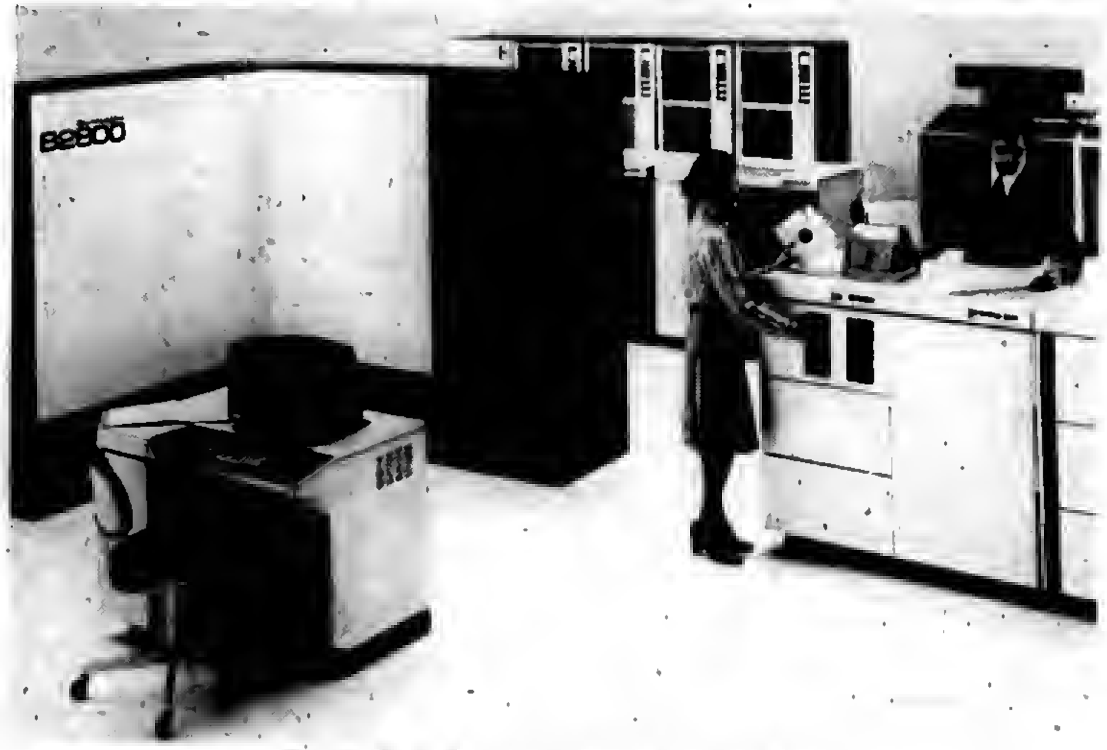
In addition, the B6806 and other B6800 series systems underwent pricing changes.

A basic B6807 with a 6.67 mHz central processor, a 20-channel I/O processor, maintenance diagnostic processor, dual-display operator console and 1.2 million bytes of planar memory can now be purchased for $589,000 or leased for $17,080/mo on a one-year lease, the spokesman said. This represents a 23% increase in purchase price and a 4% increase in lease price.

The B6811 with 1.2 million bytes of planar memory can now be purchased for $697,000 or $20,160/mo on a one-year lease. This represents a 5% reduction in purchase price and a 4% reduction in lease price.

The dual-processor B6821 with 2.2 million bytes of planar memory has been reduced 3% to $1,538,000, and the lease price has been trimmed 1% to $42,800/mo on a one-year lease. All lease prices include the 24-hour/7-day service availability.

In addition, price adjustments for the B2802 and B2803 systems were made. The basic systems with 250,000 bytes of memory now cost $151,315 and $198,095 respectively. Five-year lease rates are $3,515/mo and $4,445/mo.



Burroughs B2815 in a Financial Configuration

Zip Code Comparisons

Firm Uses 360 to Help Consumers Find Dealers

By Nancy French
Of the CW STaff

PEORIA, Ill. — A marketing services firm here is using an older medium-size mainframe and nine toll-free "800" telephone numbers to help consumers contact manufacturers or dealers who service their products.

At the heart of the Ruppman Marketing Services' 24-hours-a-day, seven-days-a-week marketing service is a leased IBM 360/40 and disk-resident data base.

An operator seated at a Courier Terminal Systems, Inc. CRT terminal here in Peoria can help a TV owner in Alaska find the most convenient place to service his TV with only a Zip Code to go on, according to Dave Ritterbusch, programmer/analyst at the firm.

The 360/40 is programmed to translate latitude and longitude into physical distances between Zip Codes. By comparing the home Zip Code of a prospect with the Zip-Coded list of dealers provided by its clients, the firm's mainframe can locate the names and addresses of the three closest dealers of the product about which the consumer is inquiring and can display it on the operator's CRT.

Conversely, the computer can also help each dealer locate its prospects and determine how to reach them through telephone advertising, direct mail and other marketing methods which, not coincidentally, can also be obtained from Ruppman.

Panasonic and British Leyland Motors are already on Ruppman's customer list, according to Ritterbusch.

Follow-Up Information

Some clients, such as the Air Force, want information captured about callers for follow-up. In that case, the operator asks the caller's name and address and keys them in along with answers to any other questions the client may want.

Ruppman can then send CPU-generated daily or weekly reports of callers' names and addresses to the client or even follow up with direct mail pieces, Ritterbusch said.

Ruppman's processor also keeps two IBM 1401 printers busy three shifts a day spewing out customized letters, some of them to customers of one loan company.

The letters, which are part of Ruppman's continuous customer contact service, "keep the customer feeling the loan company is interested in him as an individual," Ritterbusch explained, adding, "Most people who deal with a finance company feel they've been had."

These letters, which are sent out at predetermined times, try to capture what the individual is thinking about at that time and include such giveaways as budget planners.

The letters are tailored to each customer, based on the parameters of his relationship with the loan company, Ritterbusch added.

Ruppman also uses this system for a magazine collection program for several publishers' fulfillment houses, including those serving *Saturday Review* and *Ladies Home Journal*, Ritterbusch said.

When Panasonic TVs were recalled several years ago because of a manufacturing defect, Rudderman, with its data base of Panasonic TV warranty holders, played an important role. Panasonic publicized the recall program with an advertising campaign that utilized direct mail as well as use of the 800 number so TV owners could more easily find their nearest dealer for repairs, Ritterbusch said.

Interestingly enough, the firm does no housekeeping chores on the 360/40. When its accounting department was automated, a Burroughs B700 small business system with standard vendor-provided accounting packages was obtained, Ritterbusch said.

When the Model 40's lease is up next year, the firm will probably install a second 40 in a dual-processor configuration with the present system, with shared tape and disk subsystem, he said, rather than upgrading to a 370.

EMM Offers Memory Upgrade For IBM 360/65 and 370/148

HAWTHORNE, Calif. — Electronic Memories and Magnetics Corp. (EMM) has introduced add-on memory for users of IBM 370/148 and older 360/65 processors.

In its enhancement of 360/65 systems, EMM said it can now install up to 8M bytes of add-on memory per CPU. The memory offering also includes the models 65MP and 67, a spokesman added.

A deferred maintenance feature is available for all main storage which allows users to switch failing memory off-line in 1M-byte increments, he said, adding the CPU upgrade is included in the package.

The upgrade memory sells for approximately $100,000 per megabyte, the spokesman said.

IBM 370/148 users can now expand their CPUs to 4M bytes, effectively doubling the present maximum capacity allowed, according to the spokesman. The 148 memory is a functionally equivalent, pin-compatible semiconductor memory utilizing 4K static random-access memory devices, he added.

Also featured is the System Interface Module that provides the signal timing and data control functions. It also controls the Basic Storage Module that contains 18 memory boards, providing a maximum capacity of 1M byte. Each board contains 128 4K-bit elements.

Up to three Basic Storage Modules providing up to 3M bytes of storage and one System Interface Module are contained in one cabinet, according to the spokesman.

The system is priced at $75,000 per megabyte. Initial deliveries will begin late in the third quarter, the spokesman said from 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

Management Courses Listed in AMA Guide

NEW YORK — The American Management Associations' (AMA) is offering its "Management Development Guide" catalog of courses at no cost to *Computerworld* readers.

The 264-page guide lists the AMA's educational services to management.

The catalog is divided into two parts. The first covers the center for Management Development, seminars, courses, briefings, customized in-company training and career development.

The second part discusses publications, the Center for Planning and Implementation, Presidents Association, multimedia in-company training and other programs.

The catalog can be obtained from the AMA at the American Management Associations Building, 135 W. 50th St., New York, N.Y. 10020.

Datawest Introduces Array Processor, Univac Interface

SCOTTSDALE, Ariz. — Datawest Corp. has introduced both a channel interface for the Univac 1100 series processor and the Datawest Real-Time III microprogrammable array transform processor.

The interface uses the word channel as the I/O device and reportedly offers the Univac 1100 user relatively high-speed array processing, according to a spokesman.

The array processor is microprogrammable and contains its own data memory, which is expandable up to 1M byte. Word size is compatible with the 1100 series product line, he explained.

The interface costs $15,000 from the firm at 7333 E. Helm Drive, Scottsdale, Ariz. 85260.

RTE Called One of Best System Evaluation Methods

By John P. Hebert
Of the CW Staff

DALLAS — End users of computer systems are being given more importance in the systems procurement process, but one of the best evaluation methods has not yet filtered down from government to private DP operations.

That method, remote terminal emulation (RTE), is a computer measurement and evaluation technique in which the teleprocessing workload imposed on a computer system is emulated by another computer, Marshall Abrams of the National Bureau of Standards (NBS) said at a recent conference here.

At NBS, computer systems are judged by their service potential to the end user — the person sitting at the system terminal — rather than by their potential utilization, according to Shirley Ward Watkins, a computer scientist at NBS' Institute for Computer Sciences and Technology.

RTE helps the government base its procurement decisions around terminal response time and system turnaround time, Watkins explained.

Alternatives to RTE include a program internal to the host CPU or a driver implemented external to the system.

The techniques of using a tape mechanism to mimic a human operator or actually including the operator in tests do not give an accurate picture of the system being tested, on the one hand, or they allow too much data or too much subjective data to creep into the results, she indicated.

Best of Both Worlds

An RTE device emulates the terminal and the operator, allowing the best of both worlds, Watkins said.

RTEs have been around since the mid-1960s, implemented as both teleprocessing workload drivers and monitors, but now there is greater acceptance and recognition of their utility as a performance measurement tool, Watkins and the other panelists at the conference session agreed.

Working with the Mitre Corp., the U.S. Air Force has developed its own RTE, which has successfully tested a number of vendors' machines, including the Burroughs B6700; Digital Equipment Corp.'s PDP-11/70; Control Data Corp.'s Cyber series; and Hewlett-Packard Co., Honeywell Information Systems, IBM and Univac CPUs, according to Watkins.

And there are emulators which have been or are being devised by a number of vendors for their own systems.

But not all vendors' emulators with which NBS worked had the same definition of response time. A standard definition must be formulated before RTE testing begins in order to answer the questions of which system is most acceptable and whether future upgrades will be required, Watkins added.

Benchmark Objectives

Teleprocessing benchmark objectives for an RTE of the system under test are that it be representative of the service workload, be equitable to all potential vendors, that it test all system components and have a real-world resemblance, according to Jerry McFaul of the U.S. Geological Survey (USGS).

At USGS, the only existing method found able to achieve the USGS' goals was RTE, and vendors had to have their own emulators to be considered in the procurement process, McFaul told attendees.

He described USGS' heavy workload as being carried by from 48 to 96 asynchronous terminals transmitting through 300 bit/sec lines. Another 12 to 28 synchronous remote job entry (RJE) terminals are in operation at any one time at transmission speeds from 1,200 to 9,600 bit/sec.

In addition, the USGS has batch terminals running four to seven jobs with functionally distinct programs, McFaul said.

All vendors' RTEs could display both the actual CPU-to-terminal dialogue and the emulation status, while capturing the RTE traffic on log tapes, he said.

Some vendors' RTEs could display the exact position within the selected RTE "manuscripts" and all of them could also display the emulation status for the synchronous terminals in the system under test.

But minor modifications had to be made to all of the RTEs, McFaul said, explaining that the typical problem was a compounding of software and hardware errors.

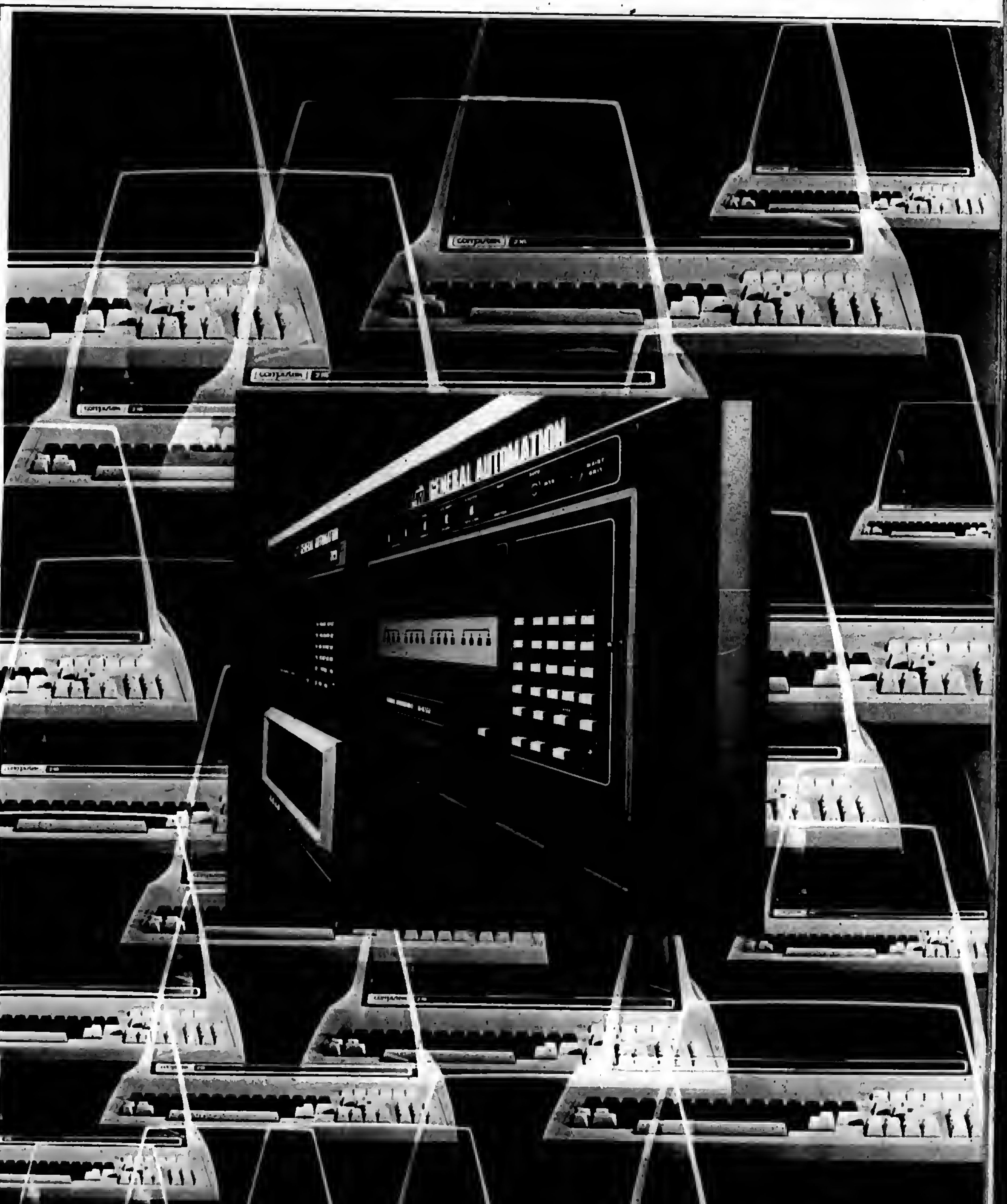
"Worthwhile Exercise"

"RTE is a worthwhile exercise. I'm confident the [Honeywell Multics] system we bought can handle a large terminal workload," he told session attendees.

And Couley Arthur, a Honeywell RTE engineer who worked with USGS was also on hand to describe RTE development and application criteria.

Honeywell's RTEs were developed by company engineers as a measurement tool and for simulation of intelligence using the terminal's protocol, Arthur said.

According to NBS' Abrams, vendors don't want the government to make a standard RTE benchmarker. It may be a long time before RTEs proceed from the ranks of government agencies to business users, he indicated.



Must Anticipate Bottlenecks

New Storage Techniques Seen Becoming Indispensable

By Frank Vaughan
Of the CW Staff

DALLAS — The performance aspect of systems is becoming so important that it may give rise to a situation where it becomes indispensable to adopt new technologies in the secondary storage environment, according to Peter Schneider of Siemens AG, speaker at a recent conference here.

Schneider discussed the demand he said he feels exists for new secondary storage technology.

"At the present state of technology, memory system costs remain the dominant factor in the overall cost of a computer system, with the costs of the secondary storage, in addition to those of main memory, representing an appreciable share of the total storage system costs," he said.

"Thus, if a new technology, such as charge-coupled device (CCD) or the bubble, is to be implemented in the storage system, it must ensure a more favorable price/-performance ratio of the overall system. It must; for example, either reduce the costs for an unchanged system performance level or substantially enhance the system performance level for a constant or rising cost burden," he explained.

Simulations have revealed that the degree of multiprogramming and the number of devices are factors of similar weight with regard to the CPU utilization level, but the number of devices represents the more crucial bottleneck, he reported.

"If the secondary storage system is underrated in terms of the number of devices employed in the storage system rather than in terms of the storage capacity, not even a high degree of multiprogramming will be able to raise the CPU utilization to a satisfactory level," he said.

"In view of the ever-increasing recording density in disks and the enhanced CPU performance levels, the emergence of a bottleneck in the secondary storage environment must be anticipated. It would appear that the adoption of a secondary storage hierarchy, managed by a storage processor, represents a more cost-effective approach than the provision of the devices required for parallel operation," he noted.

Simulation Models

Schneider supported his contentions with a series of charts, graphs and mathematical formulas that examined the simulation models used, distribution of processing time function, degree of multiprogramming, CPU utilization and page transfer times.

"For a constant on-line data file volume, an increase in the number of devices — for example, a distribution of the files among such a number of devices as are necessary to attain required I/O handling time — would considerably boost the costs and yet fail to lead to a full utilization of the devices," he charged.

Even in systems with a large on-line data file volume, the cost situation will give such a storage hierarchy complemented by cassette storage a competitive edge on a system with a large number of disks.

The performance data of the CCD technology will in any case accommodate the page transfer times which may possibly be required in the system, he said.

Quantor Ups Prices

MOUNTAIN VIEW, Calif. — Quantor Corp. has instituted an across-the-board price increase for all its computer output microfilm (COM) systems effective Aug. 1, according to a spokesman for the firm.

Prices will be increased, an average of 5%, he said, noting this is the firm's first price hike in over two years.

The increase was brought about by continually expanding systems and supplies support, including field service, across the country.

Unit Shreds Printouts

GLENVIEW, Ill. — Cummins-Allison Corp. has a desktop paper shredder for computer printouts.

The Cummins 45 has a 17-in. wide throat to permit flat feeding of printouts. The unit has a 12- to 14-sheet feed capacity and will shred at a rate of 90 ft/min, a spokesman said.

The 88-lb shredder costs $1,399 from the firm at 800 Waukegan Road, Glenview, Ill. 60025.

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Mini Bits

Grosch to Present Keynote At Wang Users Conference

LOWELL, Mass. — Wang Laboratories, Inc.'s Society for Wang Applications and Programs (Swap) will meet Oct. 31 through Nov. 2 in Boston, according to a spokesman.

A variety of presentations, workshops and panel discussions will be presented. Dr. Herbert R.J. Grosch, president of the Association for Computing Machinery, will be the keynote speaker.

Special training courses will also be offered. Further information is available from Swap, Wang Laboratories, Inc., 1 Industrial Ave., Lowell, Mass. 01851.

Incosan Unveils PDP-8 Interface

SPARTA, N.J. — Incosan, Inc. has a single serial interface board it said is capable of driving three serial devices from one Omnibus slot in a Digital Equipment Corp. PDP-8/A or PDP-8/E system.

The unit is a standard quad-height board with three DEC-type serial interface connectors attached to it. Serial devices are plugged directly into the board.

The Incosan board is particularly suited to a DEC VT50 or VT52 Teletype-replacement CRT, but any standard 20mA Teletype replacement is compatible, Incosan said.

The board is software-compatible with the standard PDP-8 keyboard/printer instruction set and can be operated without software modification, the firm claimed. It costs $695 from Incosan at 160 Woodport Road, Sparta, N.J. 07871.

RDA Has Unit for Educators

BELTSVILLE, Md. — The PRD11 system from RDA, Inc. is a portable unit based on the Digital Equipment Corp. LSI-11 and designed for educational and data acquisition applications.

The PRD11, which includes the LSI-11 and 56K bytes of random-access memory (RAM), is packaged in a 23-lb suitcase configuration, a spokesman said.

The unit can handle up to four Basic langauge users. In data acquisition applications, it can accommodate up to 64 analog and digital channels, the spokesman noted.

The PRD11 with 32K bytes of memory and a serial line interface costs $4,950.

A typical system with 56K bytes of RAM, fixed and floating arithmetic, serial I/O, Linc tape mass memory, Texas Instruments, Inc. TI 745 portable printer terminal and DEC RT11 operating system costs $11,790 from RDA at 5012 Herzel Place, Beltsville, Md. 20705.

More Tasks Off-Loaded

Citibank Proofing Operation Gets Minis

By Esther Surden
Of the CW Staff

NEW YORK — In yet another application, Citibank here has replaced a system formerly running on a large IBM mainframe with five minicomputers.

Called Citiproof, the application is part of a larger integrated customer transaction, financial service reporting and corporate accounting system due to be implemented soon. The Citiproof application handles more than $12 billion in transactions daily using 160 proofing centers.

The system captures about 75,000 detailed transactions of corporate customers each day and provides summary records of more than two million corporate and personal checking transactions.

In accordance with Citibank's corporate philosophy of decentralization "we almost out of necessity had to go the minicomputer route," according to Brian Trainor, vice-president in charge of implementing the Citiproof system.

Prior to the installation of the minis, the bank performed the application on an IBM 360/158. "Every department in the bank would submit a handwritten proof and those proofs would be keypunched and run into the 158, where they would be edited and the general ledger updated. We discontinued that in August of last year," Trainor said.

Digital Equipment Corp. PDP-11/70s were chosen as the minis to handle the application "really on the basis of our experience with DEC," which Trainor described as "quite extensive.

"At the time we had about 30 DEC systems in the bank and had written a lot of general software on the system," he explained. It also turned out the software vendors with which the bank was most familiar and in which it had the most confidence were vendors with experience on DEC equipment, Trainor said.

Application software for the system was written by Cibar, Inc. of Colorado Springs, Colo., in conjunction with Citibank Operating Group personnel.

Cibar also had experience in the bank and had been in the bank for two years prior to the development of Citiproof. "They are a very small outfit, but very very good. We have found them to be creative, innovative and very reliable," Trainor stated.

Two of the bank's people worked with three of the vendor's people in a development effort that lasted only six months.

"We actually began programming during the month of January and ran parallel during the month of July," Trainor recalled.

The five PDP-11/70s at Citibank each have 192K bytes of memory. Eventually, there should be six of the systems handling the function and five more handling a management information system (MIS) and accounting system function, he said.

The Citiproof application merely acquires the data for accounting and captures information about each individual transaction. The information then must be fed into the accounting system and the MIS system so "we can assure that MIS data and accounting data when reported is at least reconcilable."

The minis can communicate with each other, Trainor noted. The Citiproof systems are written under DEC's RSTS operating system and "we have an RSTS-to-RSTS communications capability so we can transmit files or records between the systems," he added.

The bank is developing an RSX-to-RSX communications capability as well, because the accounting and MIS systems are written under that operating system, he explained.

The next step, he noted, is to "develop an RSTS-to-RSX capability that will make us totally able to communicate between systems."

Interdata Configures Systems For Scientific Applications

OCEANPORT, N.J. — Interdata Inc., has configured two of its systems specifically for scientific users.

The Laboratory System-16 (LS-16) includes a 16-bit Interdata 5/16 processor with 48K bytes of memory, dual floppy disk drive, CRT console terminal and 16-channel analog-to-digital converter. The unit runs under Interdata's OS/16 MT2 foreground/background operating system and features Extended Fortran IV, a spokesman noted.

Because the LS-16's micro bus is compatible with Intel 8080 and Motorola 6800 microprocessor logic, the system can serve as a central laboratory computer to control microprocessor-based instruments or peripherals, he claimed. It can also communicate to a larger host processor.

The larger of the two systems, called the Fortran Processing System, includes a 32-bit Interdata 8/32 processor with 256K bytes of mainframe memory, floating-point hardware, bootstrap loader, 10M bytes of disk, CRT console terminal, the OS/32MT multitasking operating software and Fortran VI, the firm said.

It is suited for users who wish to develop and execute Fortran programs, the company noted, and can execute programs with large data arrays.

The system was designed for linear programming modules, matrix manipulations and image-processing applications and will fit the needs of users in industrial research, biomedical and biochemical engineering, it added.

The LS-16 system costs $15,425 while the Fortran system costs $75,000. Interdata is at 2 Crescent Place, Oceanport, N.J. 07757.

Datapro Sees Speed Top Factor For User Picking Mini Printer

DELRAN, N.J. — Speed of operation is the overriding criterion for minicomputer printer selection, according to a report called "All About Minicomputer Printers" from Datapro Research Corp.

"Because speed is the first consideration, it is unfortunate that printer speed can be difficult to evaluate. The reason is that a printer's effective speed frequently depends on factors to which it is difficult to assign values," according to the report, which evaluated 315 models of minicomputer printers from 96 vendors.

Effective speed "can depend on the distribution of characters in the text to be printed, the number of characters in the text to be printed, the number of characters in a line and the layout of the form being printed," the researchers said.

Although a complete discussion of the factors involved in evaluating the speed of printing devices was deemed beyond the scope of the Datapro report because of the complex mathematics involved, the firm did highlight some areas for the prospective user to consider.

User Consideration

"The usual approach to evaluating performance of mechanical devices is to determine the basic cycles or repetitive actions and go from there." However, this presents a problem in the printer area, according to the report.

The logical cycle may not agree with the basic machine cycle. For example, the time it takes to print a line and space to the next line may not match one revolution of the drum or one circulation of the print train,

(Continued on Page 48)

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Can't Be Resold

System 34 Licensed Software Policy Worries MIC

CHERRY HILL, N.J. — The IBM System 34, which is bound to be a serious contender for the user's dollar, pulls some surprise punches, according to a report by Management Information Corp. (MIC).

"What surprises us is the fact that IBM announced the System 34 . . . fully nine months before its January 1978 delivery date," the firm said in the June issue of *Small Business Computer News*.

"What worries us," the report continued, "is that with the System 34, IBM has joined with NCR and Burroughs in a new pricing policy whereby systems software cannot be purchased with the hardware, but is licensed to users and paid for on a monthly basis.

"In other words, the user who purchases a System 34 will not be able to sell the system with operating software; whoever buys it will have to go back to IBM for such software."

The System 34 is more powerful and versatile than the 32, but it is also more expensive if entry-level configurations are compared, the article noted.

A System 34 configuration with 32K bytes of memory, 8.6M bytes of disk, a diskette and a 40 char./sec printer costs $1,200/mo compared with $1,000/mo for a comparably configured System 32.

"With the System 3, the comparison is more delicate since the various models of the System 3 have different capability mixes. Generally speaking, the System 34 is not as powerful as some models of the System 3, but it is faster and more versatile," MIC said.

The following are some comparisons with the IBM 3 made in the article:

- Memory cycle time: The System 34 is twice as fast as the System 3.
- Storage capacity: 65K bytes for System 34 vs. 263K bytes for System 3.
- Operating system: The System 34 is true multiprogramming with up to eight concurrent programs; System 3 is a dual-partitioned multitasking system, not multiprogramming.
- Number of terminals: Up to eight for System 34; up to 30 for System 3.
- Disk system: System 34 uses a fixed disk with 27.1M bytes maximum capacity and 45 msec average access time, which is larger and faster than System 3 models 4, 6 and 8, but not as good as the larger models.
- Application software: The System 34 can use System 32 application software; the System 3 cannot.

A copy of the report can be obtained for $7.50 from the publisher. *Small Business Computer News* is available monthly on a subscription basis for $51 per year from 140 Barclay Center, Cherry Hill, N.J. 08034.

Unico System Based on 8K Mini

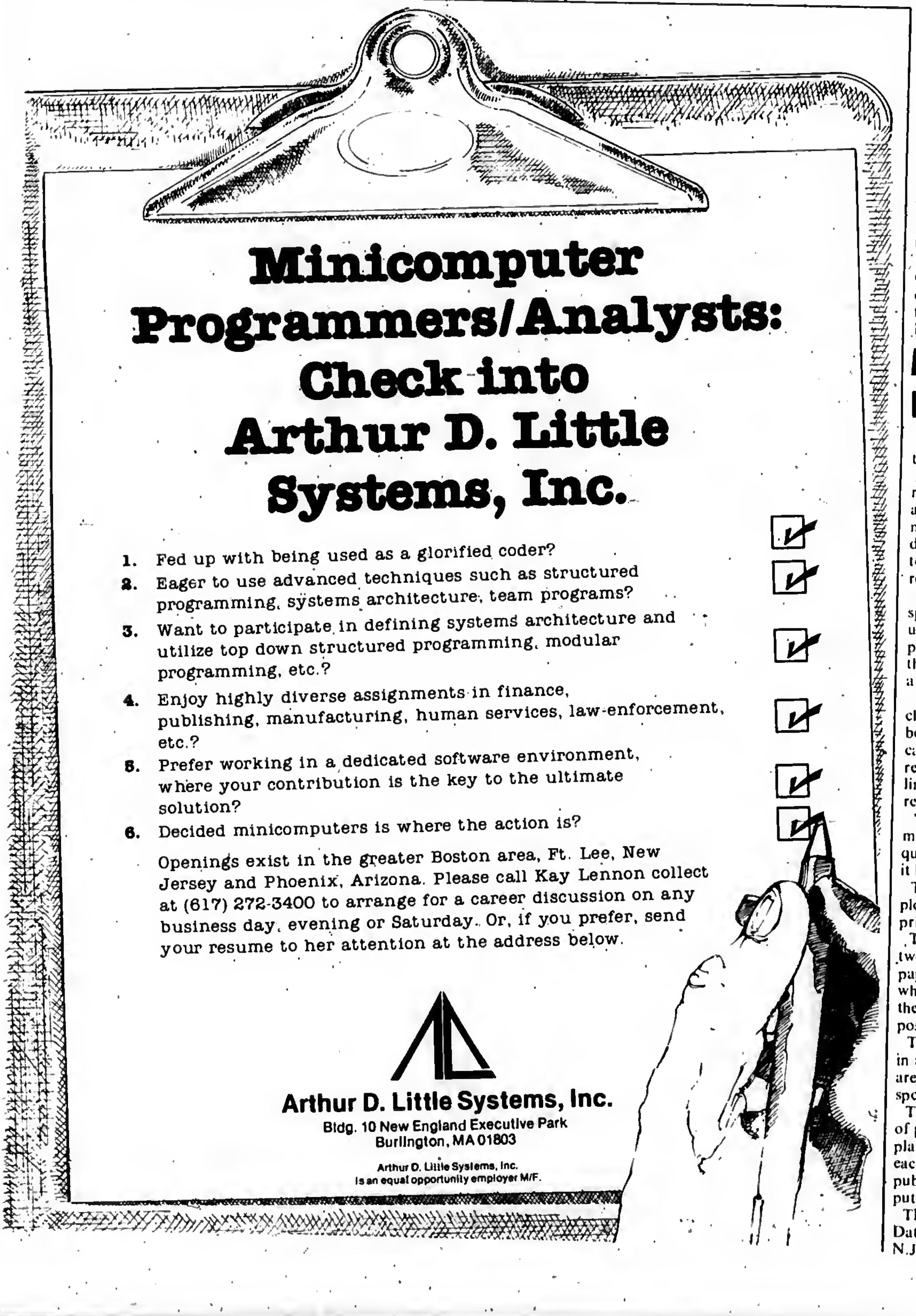
FRANSVILLE, Wis. — The Unico, Inc. System IV Direct Numeric Control unit is based on a single-board 8K minicomputer.

Designed for use in materials handling, food and drug processing and measuring and gauging applications, the System IV uses Unico Real-Time System software. It is said to offer the size and convenience of a programmable controller with the flexibility of a general-purpose system.

Three modes of operation are available. The test mode is used for diagnosing hardware and software problems; the load mode to enter diagnostic programs, application programs and system data; and the run mode for normal system operation, Unico said.

Memory on the system can be expanded to 32K words of data and instruction storage, the company noted. The system recognizes the instructions of the Digital Equipment Corp. PDP-8 mini, a spokesman added.

The System IV costs $17,258 for an 8K CPU, keyboard, display, paper tape reader, data I/O station, power supply and data interface module. Unico is located at 3725 Nicholson Road, Fransville, Wis. 53126.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Mini Printer Speed First Consideration

(Continued from Page 47)

the report explained.

For a character-at-a-time printer, the time required to print a character depends on the arrangement of the printing mechanism and may be constant for all characters or vary depending on the location of the character to be printed on the printing element, the report continued.

Character printers usually run at the speed of the slowest character to achieve a uniform printing rate. "Thus, the average printing rate is the time required to return the carriage and the time required to space a line."

Keeping this in mind, the average speed in char./sec for a highly formatted form could be lower than the quoted peak speed or, because substantial time savings can be realized for short lines, the speed quoted in line/min "could be quite respectable," the researchers noted.

"As a rule of thumb, frequent short lines make a character printer look good and frequent line-spacing operations tend to make it look bad," they added.

The design and execution are more complex for a line printer than for a character printer, Datapro noted.

They are dependent on coordination between the printing, usually done while the paper is moving, and the logical operations, which compare the contents of a buffer in the printer to the character coming into position for each print column, it explained.

The number of different symbols printed in a line and the size of skips between lines are the basic factors affecting line printer speed, Datapro reported.

The report identifies all the various types of printers and printing techniques and explains advantages and disadvantages of each. In addition, specifications are published on various vendor's minicomputer printers.

The 73-page report costs $12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

COMPUTER INDUSTRY

CI Notes

SBS Puts Out Bid Request For TDMA Burst Modems

McLEAN, Va. — Satellite Business Systems (SBS) has issued requests for proposals for the design and manufacture of high-speed time-division multiple-access (TDMA) burst modems for its communications satellite earth stations.

SBS asked for fixed-price proposals for delivery within 12 months of five prototype modems — four equipped for operation at 48M bit/sec and one equipped for operation at 43M bit/sec.

SBS said it contemplates the award of contracts to two manufacturers whose modems will be subjected to competitive evaluation by SBS. Each manufacturer would keep two modems for life testing at its facilities and deliver three to SBS for field trials.

Responses are due within 60 days to SBS at 8003 Westpark Drive, McLean, Va. 22101.

Documation Cuts Personnel

PALM BAY, Fla. — Documation, Inc. has laid off a portion of its production, engineering and administrative personnel at its main manufacturing facility here.

In conjunction with the reduction in its work force, remaining employees here are being asked to schedule their vacations so they fall in the company's second quarter ending Aug. 12.

A spokesman for the company said the personnel reduction is intended to bring inventories in line with sales projections for the second quarter.

Raytheon Plans Terminals

BURLINGTON, Mass.— Watch for Raytheon Data Systems' new line of terminals which it said will be competitive with the IBM 3274 and 3276 in both features and price. The line should be revealed in mid-August.

Supershorts

Rockwell International and Sharp Electronics of Tokyo have signed a licensing agreement under which Sharp will manufacture and market Rockwell's line of PPS-4 and PPS-8 microprocessors.

— — —

BOC Datasolve, Ltd. has acquired the exclusive marketing rights in the UK to the computer application systems of McDonnell Douglas Automation Co.

'No Technology Transfer'

CDC Defends Wisdom of Cyber Export

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — The government's refusal to permit export of a Control Data Corp. Cyber 76 to Russia invovles no transfer of technology, does not represent a threat to national security, and could result in social and economic damage, according to testimony presented before the International Economic Policy and Trade Subcommittee.

The Commerce Department blocked the sale on the grounds that the computer, destined for weather forecasting applications, could be put to military uses. CDC termed the denial "political" [CW, July 4].

"The refusal of the United States government executive agencies with responsibilities in this matter to allow us to correct the misunderstandings of the case should be seen for exactly what it is: an evasion of their statutory responsibilities," Robert D. Schmidt told the House Committee on International Relations.

Schmidt, who is executive vice-president and member of the board of directors of CDC, stated that export license denial on national security grounds is to be made only when the export would make such a significant contribution to the military potential of the importing country as to be detrimental to the U.S.' national security. CDC, he added, "simply cannot accept the premise that our national security is so precariously balanced and thinly protected as to be threatened hy the export of this computer."

Supporting Points

CDC's testimony contained six main points:

- There is an important and legitimate need for a computer of the size and capability of the Cyber 76 to be installed in Moscow.
- There is no reason to believe the USSR will use the computer for any but the stated end use.
- Conditions and safeguards can he applied to the computer that will minimize the possihility that operation of the machine could be diverted from its authorized weather data function.

(Continued on Page 54)

CCIA Warns of Grave Dangers From De Facto EFT Standards

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — The Computer & Communications Industry Association (CCIA) said it supports several recommendations put forth in the National Commission on Electronic Fund Transfers (EFT) working papers, but urged that body to reconsider its position on industry standards.

In recent testimony before the commission, the CCIA endorsed deregulation of EFT equipment, limiting regulation to the transparent communications network and maximum separations approach for EFT services.

It warned, however, of grave dangers in the working paper's de facto standards proposal.

"While we agree with the commission that 'federally' mandated standards, in the sense of technical standards developed and enforced by a federal standards body, for EFT terminals and systems may not be appropriate at this time, still, in looking at the nature of the evolving EFT marketplace, we believe firmly that industrywide standards are a necessity," the testimony stated.

The CCIA supported comments offered last March by the American National Standards Institute Standards Committee, which noted "the success of EFT is dependent upon development of standards . . . which will make possible nationwide or international interchange. Well-developed standards will promote the participation of large and small suppliers in providing equipment to the users."

While agreeing with the EFT commission's conclusion that mandating standards would be contrary to the principle of minimum regulation, the CCIA suggested the only alternative is not a situation that merely requires any company achieving market dominance to publish its standards in a timely fashion.

"Rather than proposing a solution of such questionable worth and enforceability, CCIA believes [the commission] should call for the creation of a federally chartered or-

(Continued on Page 54)

Printer Industry Gearing Up For Likely Market Shakeout

By Molly Upton
Of the CW Staff

DALLAS — As the larger printer manufacturers rush to expand their lines with both higher and lower speed printers, many exhibitors at a recent conference here agreed there could be a shakeout in the industry before too long — if it has not already hegun.

Others are scurrying to establish themselves in particular niches in the marketplace.

The printer makers seemed to have the lion's share of new products on the exhibit floor, with many of the products representing new ventures in either speed or technology for particular firms.

"The shakeout is already happening," according to Chandler Williams, manager of business systems for Tally Corp. "There are a lot of little guys not doing much," he explained.

Ben Taniguchi, vice-president of sales for Dataproducts Corp., said he thinks there will be a shakeout. The key to survival lies in the ability to provide a full spectrum of user needs, he added.

George Rea of Centronics Data Computer Corp. said it is hard to say specifically whether there will be a shakeout. However, he added, the printer market "is certainly competitive, and families of products need to he extensive.

"Users demand flexibility, and if you don't have the range, it's difficult to compete."

However, Melvin Litvin, president of Data Printer Corp., disagreed, observing there are more firms getting into the line printer business now than in the past, and the market seems to he able to support them.

Ron Huch, president of Dataroyal, Inc.,

(Continued on Page 54)

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Five-Year-Old Firm

Prime Chalks Up Its First Positive Retained Earnings

By Molly Upton
Of the CW Staff

BOSTON — After five and a quarter years of operation, Prime Computer, Inc. has achieved positive retained earnings, President Kenneth G. Fisher told stockholders here recently.

With the first quarter of 1977, the mini maker had $500,000 in retained earnings, thus marking the firm's transition from a "highly leveraged" firm to a "solid, almost conservative company," he remarked.

Earnings for the quarter totaled $732,000 including a $150,000 credit, compared with $365,000 including $177,000 in credits in the same period last year. Sales grew 135% to $9.3 million compared with nearly $4 million in the year-ago quarter.

The balance sheet in the second quarter of 1975, when Fisher assumed his position at Prime, showed negative worth of $3.1 million, he said.

The cash position on the balance sheet has also improved, from $75,000 in the second quarter of 1975 to $1.3 million in the first quarter of 1977, he added.

The firm is in the process of finalizing a $20-million line of credit with several major banks. Currently it has a $10 million line with the First Pennsylvania Bank, he said.

Although Fisher said he won't preclude another equity offering, it will not be in the immediate future. "It will be some months," he predicted.

Solid Megamini Market

Prime's products fall in the higher end of the mini spectrum, and the market for megaminis is very firm and very solid, Fisher observed.

The firm's thrust is to offer large-scale functionality for mini prices, and no one else is really doing this, Fisher said. Thus, the market is fairly elastic.

However, the low-end mini arena is becoming a price market, which the firm intends to avoid, he added.

Prime's interactive minis range from OEM systems to the Model 500, introduced this year.

An increasing portion of Prime's shipments consists of larger systems to the end-user community, Fisher said.

The average value per unit shipped increased 64% to $37,600 in 1976, and the average price of systems sold incorporating a Model 400 was $132,200, according to the annual report.

Prime is intentionally stabilizing its OEM and data acquisition/collection business, Fisher added.

In 1976, about 70% of product revenues came from the business DP and computational processing markets, which contributed 33% and 37% respectively, according to the annual report.

The firm's largest single customer is Linotype-Paul Ltd., which accounted for 12% of product sales during 1976. Prime's five largest customers accounted for 38% and 31% respectively of sales for 1975 and 1976, the report indicated.

During 1976, the end-user customer base grew 58% with new-name accounts. Those new-name accounts ordered 82% of all end-user systems sold for the year, Fisher noted in the report.

Prepared to Lead

Prime, which provides systems software rather than applications software, sees the increasing importance of software as a plus, since it is "quite prepared" to be a leader in the systems software area, Fisher said in response to a shareholder's question.

Present production capacity, which recently doubled, should be adequate through sales of $100 million, Fisher said, adding the firm is getting more plant production per square foot because of the sale of larger systems. Prime recently added 75,000 square feet to its facility in Framingham, Mass.

During 1976, sales doubled to $22.8 million from $11.4 million, largely as a result of the sale of larger systems and an expansion of the marketing organization from 74 persons at year-end 1975 to 214 persons at year-end 1976, the report said.

Gross margin increased to 54.6% in 1976 from 49.1% in 1975.

Cost of sales as a percentage of revenues fell from 50.9% in 1975 to 45.4%. Although expenditures for product development and engineering increased in dollars to $1.6 million in 1976 from $876,000 in 1975, they decreased as a percentage from 7.7% to 6.9%, the report indicated.

However, Bill Poduska, vice-president, research and development, said in an interview that R&D expenditures are expected to track around 7% of sales or a bit higher, since marketing expenditures are not expected to grow at their previous rate.

Prime's international order rate has been holding at 40%, despite economic problems in various countries, Fisher said.

Established Firms 'Missed Retail Boat,' Panel Agrees

By Toni Wiseman
Of the CW Staff

DALLAS — Almost every company that has a significant place in the retail DP market today was not in business three years ago, while those firms which have been around for years missed the "retail store boat," according to a panel at a conference here recently.

"Most companies have imagination only once in their careers," Adam Osborne of Osborne & Associates, Inc. said, suggesting the larger, established firms did not have the vision to see the opportunities of a new market.

This new market, Osborne noted, is not wide in terms of functions of new products, but rather new functions or applications of old products.

'Crazy Like Foxes'

When Mits introduced its $500 kit, everyone thought the firm was "nuts," he said. "They were — crazy like foxes."

And Icom, when it begun selling peripherals, had to pay cash for the floppies because its supplier, Pertec, thought so little of the company's prospects. Eighteen months later, "Pertec bought Icom for a substantial price," Osborne pointed out.

Missed Chance

In these and many other cases, the established companies could easily — more easily than a new company — have gotten into the market, but they simply didn't realize the opportunity. "The firms that existed could not see what was coming and did not move in time," he explained.

There is no such thing as a classical hobbyist, he stated. The bulk of retail store business is not from the guy who pays thousands of dollars to play Star Trek, but from systems analysts and others in the industry who are moonlighting in their spare time as consultants, for instance.

Quick Millionaires

"This is a market in which some people will become millionaires in a very short time by producing products which are sorely needed," Osborne said.

He characterized the market as "the last incarnation of the Old West" where there is gold lying on the ground waiting for someone to pick it up.

"For the next nine to 12 months, you are the first person thinking of something because it just couldn't be done before. So don't limit yourself by thinking it's so simple someone must have already thought of it," he urged.

"The most important thing to remember in the retail market is that this is a new market which is being created, one that never existed before, and it is not servicing past customers or problems.

"You can't try to find a customer base and service its needs because you have to make your market, not fill one," he observed.

Limited Resources

Bruce Venetta of IMS Associates, Inc., noted the problems of the retail manufacturer and its product line are engendered by its limited resources: "There simply aren't a lot to draw on."

And these limited resources must be divided among documentation, hardware, customer support and service, application assistance and system integration, he said.

"It becomes a balancing act — do you provide good documentation on a few products or a wide line of hardware with questionable documentation?" he asked.

Customer Power

"We'd like to do what the customers want us to. They are voting with their dollars, so we usually do what will make us the most money. If we decide wrong, customers don't buy and that tends to get us back in line," Venetta pointed out.

He noted that in the beginning, the way a new company usually got the last bugs out of its system was to spend some time on it in the design cycle and then sell it so the money would start coming in.

At the same time, the vendor would start getting mail from the engineers who had bought the systems and often provided the solutions.

Bigger Than Garage Business

But the retail store of today is more than the garage operation which satisfied the needs of early home computer enthusiasts.

The first Byte Shop, for instance, grossed $8,000 in June 1976, the first month it was open; in October of the same year it grossed $25,000.

Byte Shops' Paul Terrill believes the retail store has become the "life jacket" of the market. As products flooded the market, enthusiasts needed somewhere to turn for configurations and answers to questions.

It's fine to assemble a kit, he said, but after that you have to know how to program and operate it — that's where Byte Shops come in, as a sort of "house doctor."

The question of the impact of retail outlets becomes one of "how you turn a profit out of a $10 item, and the answer is volume," Terrill said.

He left the audience with the intriguing idea that, in the future, computers will be free, just as Gillette sells blades and gives away razors.

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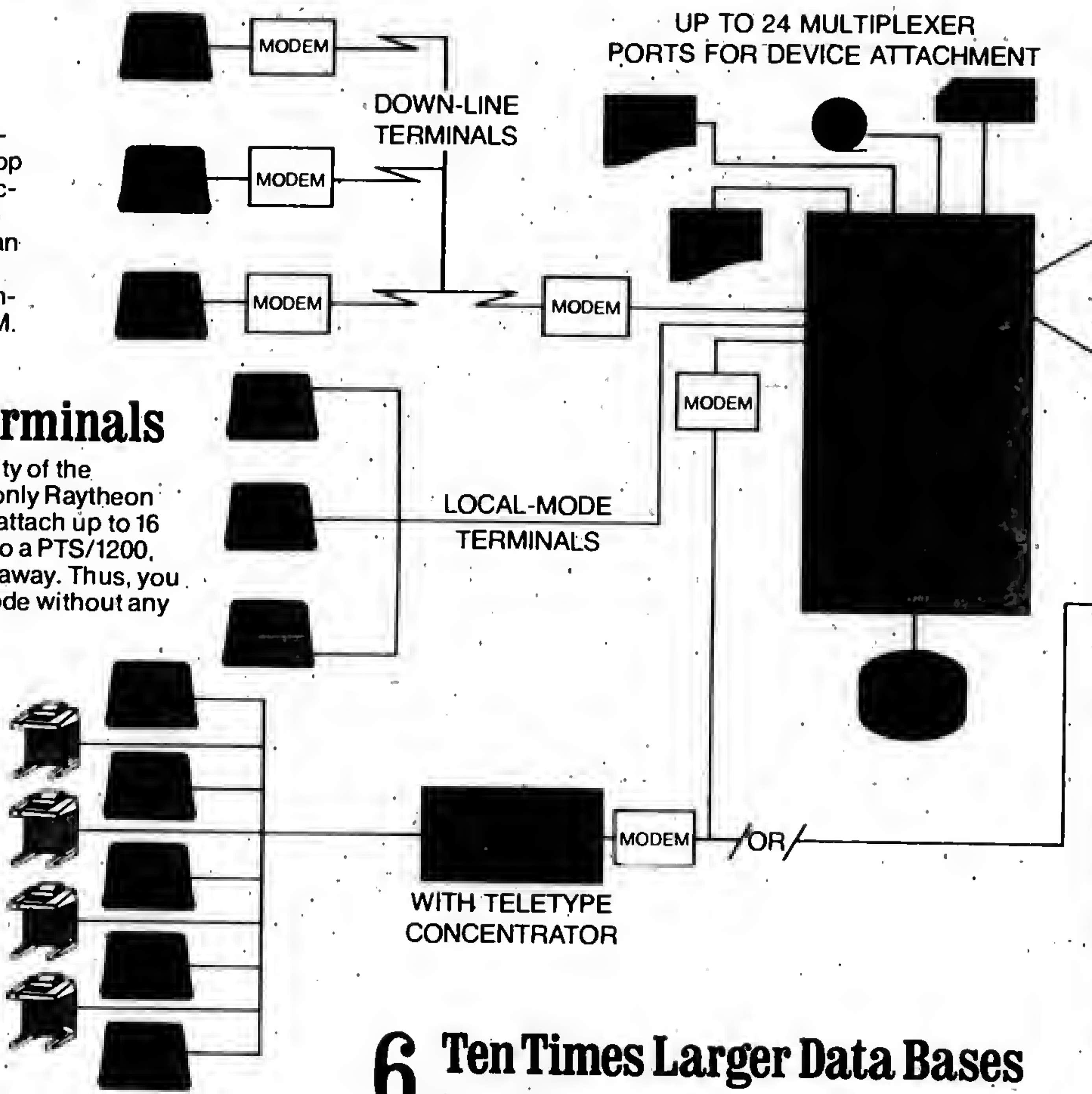
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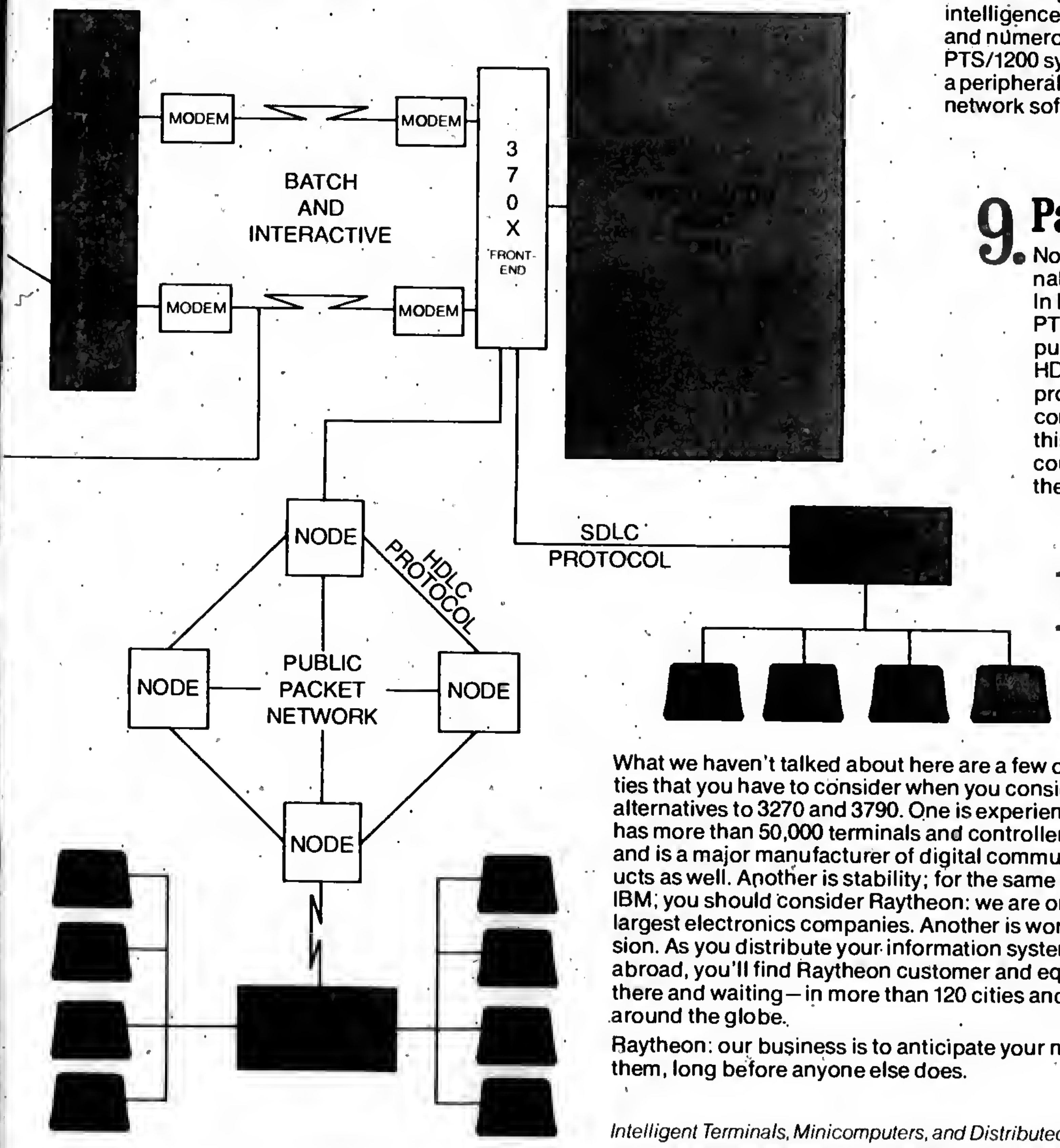

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Not with TTYs or ASCII-based terminals, but with 3270-type CRT devices. In March, Raytheon demonstrated its PTS-100 terminals operating on a U.S. public packet network under both HDLC line protocol and X.25 device protocol. We are the only major U.S. company operating such terminals on this international standard in other countries. Now we have it for you in the U.S.

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And yes, every system in the PTS-100 family operates under SDLC protocol if you want it to. Or binary synchronous. Or HDLC. Or 1006. Or 2848/2260. Or Uniscope. Among many others.

What we haven't talked about here are a few other capabilities that you have to consider when you consider Raytheon alternatives to 3270 and 3790. One is experience—Raytheon has more than 50,000 terminals and controllers in use today, and is a major manufacturer of digital communications products as well. Another is stability; for the same reason you like IBM, you should consider Raytheon: we are one of the world's largest electronics companies. Another is worldwide dimension. As you distribute your information systems here and abroad, you'll find Raytheon customer and equipment service there and waiting—in more than 120 cities and 35 countries around the globe.

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CDC Defends Wisdom of Cyber Export to Soviet Union

(Continued from Page 49)

- A much clearer perspective is needed on the question of what constitutes significant output of a computer and on the role of the Cyber in activities of a strategic nature.
- This export involves no transfer of technology.
- There are many other considerations, including social and economic, which should he brought to hear on the decision.

Describing the global telecommunications weather forecasting network (Hydromet) proposed by the World Meteorological Organization, Schmidt noted the Moscow link is critical to the project's sucess.

Hugh P. Donaghue, a CDC vice-president, testified that the Moscow center currently is the lowest powered in the network, and the addition of a Cyber would do no more than bring that center into line with other regional centers.

Schmidt added that, in addition to a detailed set of safeguards to prevent unauthorized use of the computer, the power of the machine dictates that it he dedicated solely to the weather forecasting application.

"It is naive to believe that the Soviets are not rapidly developing ~~an~~ indigenous com~~puter~~ industry. A review of the literature will show that the installed base of computers in the Soviet Union was in excess of 25,000 in 1976 and that annual production is in excess of 5,000 systems per year," Schmidt noted.

Finally, Schmidt suggested several social and economic ramifications of the export.

Americans, for example, are generally uninformed ahout the vast Soviet resource of available technology that could provide solutions to such U.S. problems as improved energy conservation, greater environmental protection and more efficient water conservation, he said.

Cooperative ventures aside, Schmidt indicated that the single Cyber sale represents nearly 600 jobs for one year at CDC alone and more than 100 jobs at firms who supply parts to CDC.

"Seven hundred good jobs certainly are not insignificant, but they are but a small part of what will be denied in the aggregate," he said.

Schmidt estimated that in the next 10 years, the value of the Communist-installed computer base, exclusive of minicomputers, will he $43 hillion, representing an $8- to $10-billion market opportunity for U.S. firms over that period.

By 1985, the U.S. could enjoy sales in excess of $2 billion per year — a level of 100,000 jobs, he noted. An additional $1.2 billion market, of 50,000 jobs, would arise in the peripherals area, he added.

"In addition to the competition from Communist Bloc countries, the Japanese and German competition is going to be tough during these years in both Third World and Communist Bloc markets.

"The decisions being made at this time will largely determine whether or not U.S. computer manufacturers will be able to achieve the potential reasonably available to them," Schmidt told the subcommittee, emphasizing that "denial of the export license for Hydromet will have adverse consequences on future U.S. computer sales."

Printer Shakeout Seen Coming

(Continued from Page 49)

said a shakeout is possible. The market is "getting very competitive, and it's easier to make printers, so a lot of firms are coming in."

Huch's approach is to pick a particular niche in the market and concentrate on it, rather than span a broad range of capabilities.

Although no American exhibitors on the floor were displaying ink jet technology, many indicated they are giving the concept some serious study.

Centronics is "taking a hard look at ink jet printing," Rea said. The firm intends to be a leader in printers and is looking carefully at that technology, he indicated.

Taniguchi said he thinks ink jet technology "will eventually make it," but is not here yet.

Joe Greenwood, marketing product manager for printers at Diablo Systems, said the firm plans to compete with IBM's ink jet technology but by using its daisy wheel and "some other techniques."

Tally expanded its line with a top-of-the-line 500 line/min printer and also added a teleprinter, the T1612, which includes an Intel 8080 and offers features such as a 4K buffer.

Centronics, known for its medium-speed printers, expanded in both directions — adding a 900 line/min printer ~~and~~ an electric discharge printer that operates at 180 line/min over 80 columns.

Data Printer chose to reenter the lower speed portion of its line-printer business with a 300 line/min Chaintrain band printer. Litvin explained the firm previously had a 300 line/min printer, but it did not gain market acceptance because of the price.

Dataroyal reconfigured its IPS-7 into the IPS-7000, which represents a 30% to 40% price reduction over the previous model, according to Huch.

Diablo showed its new 1660 terminal, which incorporates the firm's 200 char./sec matrix printer.

CCIA Sees Dangers In EFT Standards

(Continued from Page 49)

ganization to sponsor and administer the national and international voluntary standards activities in EFT.

"Standards activities in EFT under the sponsorship of such an organization would be implemented in a speedy fashion in all federal EFT systems, thus creating a framework for inducing local statewide EFT systems to follow suit," the CCIA stated.

There are definite indications that the future viability of EFT may be in jeopardy if the issue of standards is not resolved soon, it added. In order for the EFT system to be profitable, it must have high usage and be accessible to a variety of institutions and system users. EFT will not be economical if separate terminals are needed for different credit cards, it stated.

The CCIA testimony recommended the development of voluntary national and international standards should be the shared responsibility of both the private sector and the federal government.

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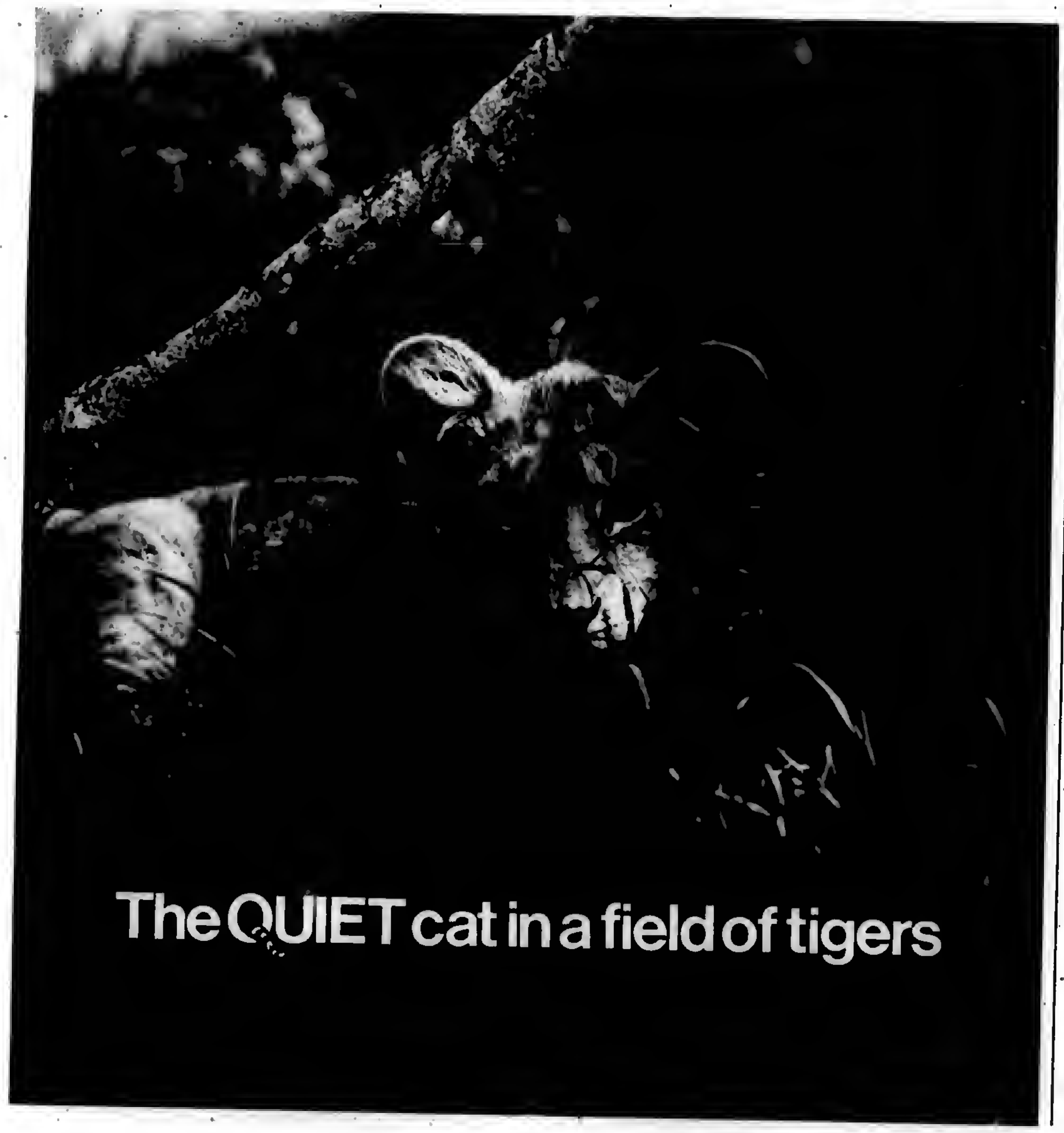

Seeks Dominant Position

Cray Answering Scientific Arena's Cry for More Power

By Ann Dooley
Of the CW Staff

CHIPPEWA FALLS, Wis. — "We hold a dominant position in a narrow field and that's exactly where we want to be," according to Seymour Cray, president of Cray Research.

In the five years since Cray left Control Data Corp. to start his own company, he and his small staff have developed, manufactured and marketed the Cray-1, commonly referred to as a supercomputer.

The Cray-1 is intended to solve complex scientific problems. It has the ability to process vector operations as well as high-speed scalar processing ability, according to the firm. It was also designed to perform "chaining," which enables operations to be performed on several sets of data at the same time.

Seymour Cray

The company offers three versions of the computer: .25 million-, .5 million- and one million word (all with 64 bit/word) systems.

The Cray-1 consists of a mainframe and a Data General Corp. minicomputer console processor that doubles as a maintenance control unit.

It is considered an add-on computer rather than a replacement. It can be integrated into existing systems and further use of already functioning communication networks and peripherals, the firm said.

Leased Five Systems

In March 1976, the company went public and since then has leased five Cray-1 computers. The first went to the National Center for Atmospheric Research in May 1976.

Cray has also leased systems with 1-million word memories to the European Center for Medium Range Weather Forecasting, the Los Alamos Scientific Laboratory and two such machines to the Department of Defense (DOD).

All Cray-1s contracted for so far have been for the one million word capacity, but in the one-year interim it takes for delivery, companies are sent the first developed Cray-1, Serial No. 1, consisting of a .5 million word memory.

"We hope to keep farming out the Serial No. 1 until each one-million-word machine is ready," according to John Carlson, director of finance.

Although several years ago some observers claimed there was not a large enough market for the supercomputers to survive, both competition and market have opened up, he said.

Previously, only Texas Instruments, Inc.'s ASC and CDC's Cyber 76 and Star-100 were on the market, but now the Burroughs Corp. Illiac IV, the IBM 370/195, the Goodyear Aerospace Staran and potentially the IMS Associates' Hybercube systems are around.

"Burrough's entering the market also indicates to us there is definitely a market out there," Carlson pointed out.

"We also feel there is an expanding market for the large users," he said. "There is already a cry in the scientific community for more power, some are even asking for more than Cray-1."

"It's our goal to satisfy that demand," he added.

Cray has estimated there are about 100 governmental agencies, educational institutions and corporations worldwide that are potential users of the Cray-1. "Most of our clients are governmental, but we are also hitting areas where funds are currently being appropriated," Carlson said.

Last year's drought has made weather research and forecasting agencies look for faster turnaround time, he said. Nuclear and energy research are branching out and are becoming more critical issues and alternatives, Cray noted.

"Oil research will also be increasing in the next few years after the price controls have been lifted," he said.

Demand for More Power

"Our customers already have lots of power and they're demanding more," Cray said. With their expanded usage, they have few alternatives and, for the money, they will be needing the Cray-1, Carlson said.

"But we obviously must have a broader line than the Cray-1," Carlson said. Cray is in the process of researching a new product line which might or might not be called the Cray-2, Carlson said.

The Cray-1 would be the middle of the line with some machines being smaller, some larger. There would definitely be an advancement in speed as well, Carlson said.

"Initially we see most of our machines being leased with options to purchase," he said. But the DOD has a 60-month installment contract with options to revert to a lease, he added.

The one-million-word Cray-1 sells for $7,995,000 with an added error correction feature; it leases for a monthly fee of $210,500. The turnover rate for a large scale computer is judged to be about 10 years, Carlson noted.

CW Photos by A. Dooley

Gerald Simpson (left) and Jeff Bowen of Cray Research work on the Cray-1.

Real Advantage

"The real advantage to the Cray-1 is that it was developed later in time than the other large computers," Cray said. The others were built at least five years before the Cray-1.

"It's design takes advantage of those preceding it," he noted.

"I left CDC because I wanted to pursue more aggressively the kinds of computers I wanted to build," Cray explained. There are more constraints in a company the size of CDC than in a smaller one, he added.

"Now, I have more money to spend on what I want than I did when I was with them," Cray said.

Being located in a small town has never hurt the company, but the size does prohibit running the company from Chippewa Falls, Cray added. "So, we have sales and administration in Minneapolis and R&D and manufacturing in Chippewa," he said.

"I spend one-third of my time in Chippewa, one-third in Minneapolis and one-third on the road," Cray stated. "We give our professional people the choice of working out of Minneapolis or Chippewa Falls and we've never had a problem."

"I really think it's the best of both worlds; there are real advantages to living in a small town," Cray commented.

"We have defined for ourselves a more narrow market than a lot of the other companies and we've gotten 100% of that business," Cray said.

"Every procurement we've bid on, we've gotten, and it's done by being selective," he explained.

Orders & Installations

First Security Co., a tristate banking operation in Utah, Idaho and Wyoming, has ordered Bunker Ramo Corp. System 90 teller terminals and associated DP and communications equipment.

Princeton Applied Research has ordered IMP-16L/300 CPU application cards and IMP-16L/-006P random-access memory/-programmable-read-only memory (RAM/Prom) cards from the Microcomputer Systems Group of National Semiconductor Corp. for use in its medical electronics equipment.

BankAmerica Corp. has ordered a claims administration system from System Development Corp. to process employee health insurance claims.

The U.S. Army Computing System Support and Evaluation Agency has ordered a large-scale Control Data Corp. system centered around a Cyber 76 and a Cyber 173.

Computer Consulting Service, Inc. has ordered more than 100 Honeywell Level 6 Model 6/36 minicomputers valued at over $3 million.

PCA International, Inc., producer of color portraiture, has installed a Burroughs Corp. B1726 system.

The Eureka Co. has installed a Harris Corp. 8770 intelligent terminal system to handle accounting and inventory control at its Bloomington, Ill., headquarters.

The *Philadelphia Evening Bulletin* has ordered a TMS-1 text management system from Digital Equipment Corp.'s Graphic Arts Group.

Southern Bell Telephone and Telegraph Co. of Atlanta has ordered an additional 150 fast microfilm retrieval systems for directory assistance from Lockheed Electronics Co., Inc.

The City of Monroe, Mich, has installed a Burroughs Corp. B1726 system, which will process a variety of municipal applications, handle the city's general accounting functions and prepare special reports.

The Michigan Supreme Court has placed an order with Incoterm Corp. for intelligent terminals and services worth $300,000.

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By Comparing Trade Statistics

Study Uncovers Worldwide DP Appetites

By Bohdan O. Szuprowicz
Special to Computerworld

If you ever have wondered why France is so determined to develop its own viable computer manufacturing industry, just look at the international trade statistics.

France is the largest importer of office machines, computers, calculators and associated equipment in the world. Out of a total of $9 billion worth of such equipment traded internationally in 1974, France imported almost $1 billion — over 11% of all such products exported by everybody all over the world

My firm, 21st Century Research, discovered this huge French appetite for imported foreign office equipment during an attempt at ranking all the countries in the world according to the amount of DP equipment imported every year. Our objective was to spot the best business opportunities in the rapidly growing computing equipment markets in the developing countries of Africa, Australasia, Latin America and the Middle East (see accompanying box).

This also explains why we used trade statistics for 1974 and why we compared the Standard International Trade Clasification (SITC) Code 714 figures, which include not only computers and peripherals but also statistical machines, calculators, typewriters and other accessories.

The reason is that, in many developing countries, trade data collection and publication lags two to three years behind the actual shipments and before they show up in the United Nations international trade statistics. Also, some countries report only at aggregate levels, such as Code 714, without going into details of what they are importing.

International News

But Code 714 is a good indicator of the markets we are looking at because, after all, IBM, which accounts for a predominant portion of this business, manufactures equipment in most Code 714 subcategories.

Looking at a total of 128 countries, we ranked 50 of the largest importers and also indicated their exports, if any, in this product category. Interestingly, 39 of the top importers are also exporting office machinery, although only nine export more than they import.

Not surprisingly, France is not among the latter few, but it still is the fifth largest exporter of such products in the world.

Perhaps even more interesting is the fact that the U.S. is also one of the top importers of office equipment in the world, accounting for over 10% of all the trade and holding the third place behind France and West Germany.

The U.S. is often believed to have a global monopoly of this market. However, although it is the largest exporter of office equipment in the world, it only accounts for ahout 30% of the total international trade.

Off-Shore Factor

Much of the exports from such countries as Germany, France, Sweden the UK and Japan are also IBM computers and peripherals manufactured in those countries. Other American firms, such as Burroughs, Honeywell, Control Data Corp. and Univac, also manufacture some of their equipment in foreign countries and export it to other world markets as well as to the U.S.

Nevertheless, whatever the product label on the equipment, it is the manufacturing country that derives the most benefits in form of employment, taxes, duties and markets for supplies of materials and services.

Because DP equipment manufacture is a labor-intensive industry, there is every reason to believe that proliferation of computer and minicomputer manufacturing firms will continue, particularly in less industrialized countries with large populations.

Countries with high import levels of office equipment products also have strong incentives to develop domestic products hecause they can reduce their often persistent trade deficits, develop their own technological base and even engage in exports of their equipment — not to mention expanding employment and training opportunities for part of their lahor force.

Looking down the list of the top 50 importers, Canada and Australia are clearly two immediate candidates for expanding their DP equipment manufacture. Even though both are developed countries, their imports are relatively large and substitution of domestic products could support a sizable manufacturing firm.

The Soviet Union, which imports as much as Australia, is not truly comparable because most of that market is prearranged by bilateral agreements between communist countries and because only a small percentage represents imports from the West. Nevertheless, the size of Soviet imports is a good reason why the Soviet Union wants to protect its huge computer market and develop its own industry to the point where it can also compete for other markets in the world.

But talking of communist countries, it is perhaps worth looking at the enviable position of East Germany, which is the seventh largest exporter of office equipment in the world and shipped over 10 times as much as it imported in 1974. Much of this trade at present is with the Soviet Union and East Europe, but some East German office equipment is already sold throughout the world.

Brazil, Spain and Mexico clearly have a lot to gain by getting into computer equipment manufacture in a big way. Most developing countries will of course continue to import some large and special systems forever. Increasingly, however, they will he manufacturing small machines, minicomputers and peripherals which are in demand within their own and neighboring countries.

Despite the benefits of ready-made equipment and IBM service, more countries will find they have many good reasons to make an effort to fight and switch.

Top 50 DP Import Markets

(In Millions of U.S. Dollars for 1974)

Rank	Country	SITC Trade Classification Code 714 Product Category Imports	Exports
1	France	971.0	843.9
2	West Germany	967.1	1,507.7
3	USA	928.7	2,698.8
4	UK	816.4	845.6
5	Italy	535.9	437.2
6	Canada	519.8	266.8
7	Japan	492.2	727.0
8	Netherlands	357.6	288.3
9	USSR	230.9	85.9
10	Australia	230.7	17.0
11	Belgium-Lux.	222.7	128.2
12	Switzerland	206.7	113.8
13	Brazil	208.0	97.0
14	Spain	205.2	34.7
15	Sweden	181.1	278.5
16	Mexico	147.4	36.3
17	Czechoslovakia	137.8	82.9
18	Poland	110.5	60.0e
19	Austria	110.3	22.7
20	South Africa	101.8	
21	Denmark	99.6	34.9
22	Hong Kong	82.8	31.7
23	Finland	80.2	2.9
24	Hungary	79.8	33.5
25	Yugoslavia	88.8	7.4
26	Norway	55.4	10.9
27	Argentina	50.0	32.3 (73)
28	Singapore	46.8	139.7
29	Venezuela	48.3	na
30	Ireland	43.9	47.3
31	Bulgaria	43.5	30.0e
32	Iran	39.2	na
33	New Zealand	37.3	0.1
34	Portugal	36.8	28.1
35	Romania	33.8	24.3 (73)
36	East Germany	33.0	378.8
37	Israel	30.5	9.6
38	South Korea	29.2	40.7
39	Philippines	19.8	na
40	Turkey	17.8	0.0
41	Malaysia	17.2	na
42	Greece	14.8	0.1
43	Colombia	13.8	0.6
44	Algeria	13.6	na
45	Peru	12.8	na
46	Indonesia	11.5	na
47	Thailand	10.1	na
48	Saudi Arabia	10.1	na
49	Nigeria	9.9	na
50	India	9.7	4.5

Foreign Orders & Installations

C.A. la Electricidad di Caracas has ordered a Supervisory Control and Data Acquisition System from Honeywell Information Systems to monitor and control supervisory equipment at distribution stations in Caracas, Venezuela.

Keen Kraft Music, Ltd., which operates outlets in Calgary and Edmonton, Canada, has installed an NCR Corp. 399 minicomputer, two NCR 260 communications terminals and two NCR electronic cash registers,

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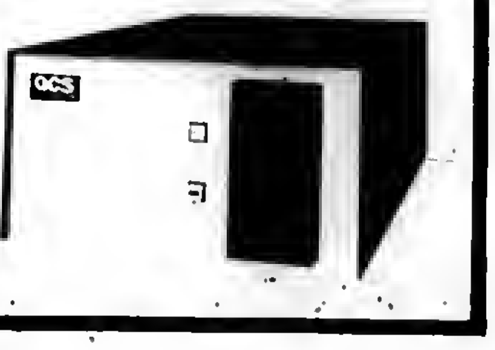


IBM Makes No. 10 on Forbes List, No. 8 on Fortune

NEW YORK — The Forbes 500 listing of large industrials is perhaps less frequently referenced than the Fortune 500 list, but it is equally complete and, in addition, interesting because the two publications' rankings vary considerably in some instances.

Forbes, besides ranking companies by assets, sales and earnings, has also compiled a listing by the firms' chief executives' total remuneration.

For convenience and comparison, the Fortune 500 ranking for each firm [CW, May 16] has been included in parentheses.

Forbes ranked IBM tenth (8) in sales, down a notch from its No. 9 position last year. The giant was, however, first in market value, fourth (3) in earnings and 19 (5) in assets.

Sperry Rund dropped three spots in the Forbes ranking to 82 (62) despite a 5.3% gain over last year's sales.

Teledyne fell eight places to 113 (115) with a 6.8% growth in earnings while Honeywell plummeted from No. 35 to 124 (88) accompanied by a 9.6% decrease in sales compared with 1975.

NCR dropped back one place to 134 (96) while Control Data Corp. rolled back eight places to 160 (173). Burroughs, on the other hand, with an 11.6% gain in sales, rose six places to 171 (120) and Texas Instruments leaped 30 slots to 198 (133) with its 21.3% sales increase.

A 13.3% sales increase moved Hewlett-Packard up seven places to 390 (200) while a 37.9% increase put Digital Equipment Corp. back on the Forbes list at 436 (280). DEC did not make the top 500 last year.

Financial News

Finally, Lear Siegler dropped down eight places to No. 460 (292).

Executives' Remunerations

Harold Geneen, of International Telephone and Telegraph drew the fattest paycheck of any U.S. chief executive — $263,000. His total remuneration, which included salary, bonuses, director's fees and deferred compensation, totaled $990,000.

In the computer industry, IBM's Frank T. Cary drew the largest paycheck — $300,000 in salary and bonuses, with $595,830 total remunerations. Cary was, however, only the 28th highest paid U.S. executive out of a pool of 798.

Burroughs' Ray W. Macdonald ranked 36, with $525,000 in remuneration; Texas Instruments' Mark Shepherd Jr. ranked 87 with $441,409; TRW's Horace A. Shepard and Sperry Rand's J. Paul Lyet are 109 and 110 with $419,895 and $419,419 respectively.

Edson W. Spencer received $399,500 from Honeywell, making him the 124th highest paid executive, while NCR's William S. Anderson was 137th with remunerations of $290,000.

William C. Norris of CDC ranked 292 with $285,471; DEC's Kenneth H. Olsen ranked 364 with $163,750 and Data General's Edson deCastro ranked 792 with $75,000.

Acquisitions

A.C. Nielsen Co., international business services firm, has acquired **Coordinated Management Systems, Inc.**, which specializes in the development of computer-based interactive marketing information systems.

Automatic Data Processing, Inc. (ADP) has acquired **First Data Corp.** and filed an S-14 registration statement with the Securities and Exchange Commission in connection with the acquisition, covering 302,334 shares of ADP common stock.

Nixdorf Computer AG has acquired **Entrex, Inc.** for $22 million in cash.

Informatics, Inc. has acquired the **Direct Dial Data System** from Greyhound Computer Corp.

Sun Information Services has acquired **Applied Financial Systems, Inc.**, which specializes in providing DP to bank trust departments.

May and Speh Data Processing Center, a division of System Development Corp., has acquired the **Chicago Data Center** of Greyhound Computer Corp.

Memorex Corp. has acquired **CFI Memories, Inc.** and its parent company, **Lencor International**. Terms of the sale call for payment of $2.4 million in cash and 200,000 shares of Memorex stock to Lencor stockholders.

Sycor, Inc. has terminated previously announced discussions aimed at purchasing an interest in three European computer companies, CMC France SA, Computer Machinery Deutschland GmbH and a minority share of Computer Machinery Co. of England.

New Registrations

SCIENCE APPLICATIONS, INC., 1200 Prospect St., La Jolla, Calif. 92037, a scientific applications computer firm, filed to register 72,500 shares of common to be offered by certain selling shareholders to employees and consultants of the company. No underwriter is involved.

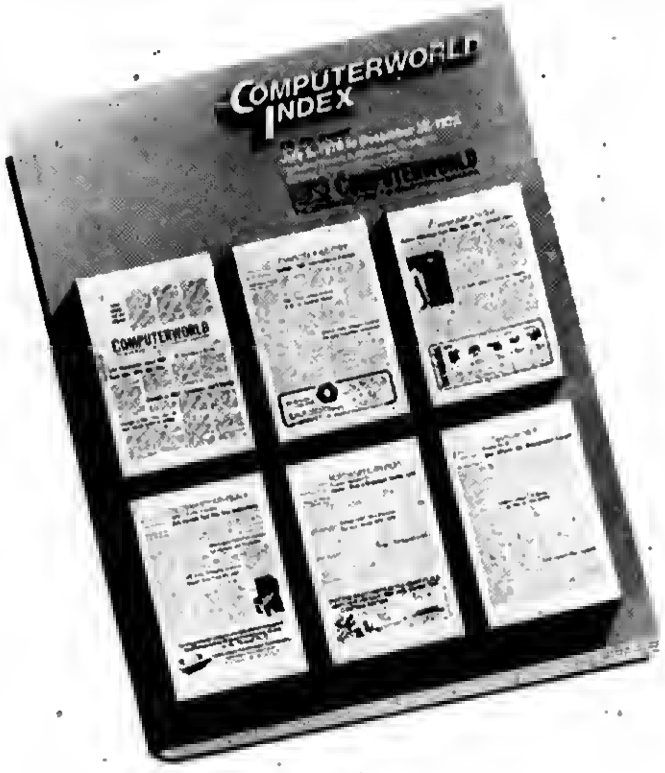
EG&G, INC., 45 Williams St., Wellesley, Mass., a scientific and technically oriented computer firm, filed to register 387,513 shares of common issued in connection with the acquisition by EG&G of Reticon Corp. on Dec. 28, 1976. The selling stockholders have advised EG&G they propose to sell, from time to time, all or part of the shares offered by them in private principal transactions and through brokers.

HONEYWELL, INC., Honeywell Plaza, Minneapolis, Minn. 55408, filed to register 1.4 million shares of common which may be sold from time to time, at prices and at terms then obtainable, on the New York Stock Exchange or other security exchanges, in the over-the-counter market in negotiated transactions or otherwise by or for the account of General Electric.

EG&G, INC., 45 Williams St., Wellesley, Mass., a scientific computer firm, filed to register 549,473 shares of common to be offered in exchange for the outstanding common stock of Princeton Applied Research Corp., Princeton, N.J., at the rate of .587 EG&G share for each Princeton share. No underwriters are involved.

AUTOMATIC DATA PROCESSING, INC. (ADP), 405 Route 3, Clifton, N.J. 07015, a computer service firm, filed to register up to 302,345 shares of common. It is proposed to offer these shares in connection with the acquisition of First Data Corp. through the merger of a wholly owned subsidiary of ADP with and into First Data. Upon the merger, each outstanding share of First Data common stock will be converted into .4529 ADP share and each outstanding share of First Data preferred will be converted into 22.645 ADP shares. No underwriter is involved.

DATA 100 CORP., 6110 Blue Circle Drive, Minnetonka, Minn. 55343, a remote data processing firm, filed to register $10 million of convertible subordinated debentures due 1992. They will be offered by the company through underwriters headed by Dean Witter & Co., Inc., 33 N. Dearborn St., Chicago, Ill. 60602.



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- There are entries by *industry*, like *INSURANCE*, under which there are 17 entries for various stories on the use of computers in the insurance industry.
- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory*, *security* and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- . . . and there are *others*: *KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries . . . and there's much, much more.

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SOFTWARE ENGINEERS

Mini-computer real time O/S, multiprocessing and large systems. Or configuration management in code control or file control systems.

Amdahl engineers will interview in Poughkeepsie and Long Island on Sunday, July 17 and Monday, July 18, and in Boston, Minneapolis and Washington D.C. on Sunday, July 24 and Monday, July 25.

Qualified professionals are invited to schedule an interview. Send your resume to Chacko Neroth, Amdahl Corporation, 1250 East Arques Avenue, P. O. Box 5070, Sunnyvale, California 94086. We are, of course, an equal opportunity employer.

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CBT is seeking an experienced auditor to conduct operational audits of the bank's computer center and its computerized applications with a minimum of supervision.

The successful candidate will possess a college degree in business administration of related area and have 1-2 years of experience. Knowledge of data processing, computer systems and programming, and/or use of audit software packages will be helpful.

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Director
University Computer Center

Florida International University at Miami is an urban, upper division, multi-campus university, serving 2.6 million residents of Southeast Florida. The computer center is part of a growing statewide computer network and supports a large number of computer-intensive academic programs, extensive administrative applications, and a growing research activity. Hardware and operating systems support is provided via the Southeast Regional Data Center and by the Northwest Regional Data Center with Univac 1108 and IBM 360 equipment respectively.

Requirements: Bachelor's degree in accounting, management, computer science, mathematics, industrial management, or other closely-related fields with extensive training in computer concepts; seven years experience in electronic D.P. work or any equivalent combination of experience and training in all phases of computer facility operations. This management position requires extensive managerial and supervisory experience with heavy emphasis on systems analysis and programming, preferably in an educational environment. Salary low to mid-twenties based upon credentials and experience. A letter of application and resume should be submitted no later than July 29th. Direct materials to the chairperson, Search & Screen committee for Director of Computer Center, Florida International University, PC 510, Tamiami Trail, Miami, Florida 33199.

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Keytronic Corp. is opening offices in New York, N.Y., Boston, Ma., and Dallas, Tx. Positions available include data processing.sales, and service representative.

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If you're interested in us and you meet our requirements, we're interested in you. You may contact our representative by calling 1-800-821-7700, ext. 307 toll free ALL DAY SUNDAY, MONDAY-FRIDAY, 9am-5pm. Or you may prefer to send your resume or letter of interest to Mr. Juris C. Peice, Manager Employee Relations, Sperry Univac, Business Systems Marketing, P.O. Box 500, Bluebell, Pa. 19422.

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RANK:
Assistant/Associate Professor

SALARY:
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CONTRACT YEAR:
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CONTACT:

Dr. Roland Spaniol, Director
Computer Center or
Dr. Thomas O. Jonas, Jr.
Dean, School of Business
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Charleston, Ill. 61920
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Ours is a medium-sized, growing manufacturing business based in Central Ohio, with 6 product lines, 5 plants, and national and international markets.

Please send your detailed resume to

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Local Interviews

Data Processing Professionals

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Bechtel, an international leader in the field of engineering and construction management, has several excellent opportunities available for:

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Development of major data base oriented Personnel systems. 5 or more years' directly related experience required which includes project planning and professional systems documentation.

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Maintain UNIVAC 1110 operating system. Design, code, test, and document sizable modifications. 3 or more years' directly related experience is required.

To arrange a local interview in early July, please call **Marshall Collins (collect) at (415) 768-9174, 9AM—4PM PDT**, or mail your resume including salary history and geographical preference immediately to: **M.B. Collins, Professional Staffing Department No. 15-7A-7, P.O. Box 3965, San Francisco, CA 94119.**

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As testors, you'll plan software tests and analyze resulting test data. A B.S. in Computer Science, Physics, or Engineering and a minimum of three years experience in testing large real-time software packages are musts.

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You'll be analyzing hardware architecture and systems performance, writing high level requirement/specifications, and projecting future technology requirements. A minimum of three years in designing processing algorithms and developing or analyzing processor system requirements and technology trends are critical. BS Computer Science, Physics, or Engineering required.

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BS degree in Engineering or Applied Physics, prefer 2-5 years related experience, FORTRAN programming skills desirable. Familiarity with one or more of the following specialties is essential: control systems, rotor systems, aeronautics, applied mechanics or graphic displays. Will provide applications programming and analysis support for simulations of conventional aircraft, helicopters, STOL and V-STOL aircraft.

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COMPUTER SCIENCES
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COMPUTER PROFESSIONALS

The J. Preston Levis Regional Computer Center (JPLRCC) provides computing services for a number of users in northwest Ohio, including Bowling Green State University, the City of Toledo, the University of Toledo, and the Toledo/Lucas County Criminal Justice Regional Planning Unit. Batch, timesharing and real-time services are offered on an IBM 360/75 and a Univac 1110 2x1. JPLRCC is located south of Toledo in surburban Perrysburg, in an area with a full range of cultural and recreational opportunities, and has the following openings:

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This position reports to the Executive Director and is responsible for all relationships with users, both through large user organizations and directly with end users. The staff which this position manages performs user consulting; applications systems design and programming; documentation and Newsletter preparation and distribution; user education; and library support. The successful applicant will have a Master's degree in a field related to computing or an equivalent combination of education and experience; at least five years of total experience in computing; have managed a group in the computing field; and have broad experience in all aspects of computing, particularly in a networking environment. Starting salary will be in the $20,000 - $25,000 range, depending on qualifications.

SENIOR SYSTEMS PROGRAMMERS (2)

Responsibilities will include systems programming support of Univac 1100 and/or IBM OS. Experience with both systems is highly desirable, but not necessary. The successful applicant will have at least 2 to 3 years experience in systems programming on EXEC-8 (1100-OS) or IBM OS or VS and be familiar with the respective SYSGEN process, and a bachelors degree or equivalent combination of education and experience. A proven ability to lead others as a project manager is also highly desirable. Starting salary will be in the $16,000-$20,000 range, depending on qualifications.

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This position requires a versatile person who can handle projects on both the Univac and IBM systems. Knowledge of IBM JCL or Univac ECL, COBOL and FORTRAN, and an assembly language are necessary. The successful applicant will have 1-3 years of systems programming experience on either system, and a bachelors degree or an equivalent combination of education and experience. Starting salary will be in the $13,000 - $17,000 range, depending on qualifications.

In addition to the indicated salaries, a full fringe-benefit package applies, including 4 weeks of vacation and tuition-free continuing education. Applicants should submit a complete resume, salary history and a list of references no later than August 1, 1977 to: Personnel Officer, JPLRCC, 25875 Dixie Hwy., Perrysburg, Ohio 43551. (JPLRCC is an EO/AA Employer)

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UNIVERSITY OF VERMONT

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The Office of Management Information and Computing is seeking a Senior Systems Analyst to coordinate the design and implementation of administrative applications under our integrated data base. Applicants must have a bachelor's degree and at least five years of DP experience, three as a Systems Analyst. Experience in COBOL and IBM/ODS are required. Applicants with higher education experience in on-line systems and DBMS are preferred. We offer an excellent benefits package; salary will be in the upper teens. Send resume and professional references by August 15 to the Personnel Department, Box 57Y, Waterman Building, University of Vermonth, Burlington, Vermont 05401.

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Denver, Colorado Area

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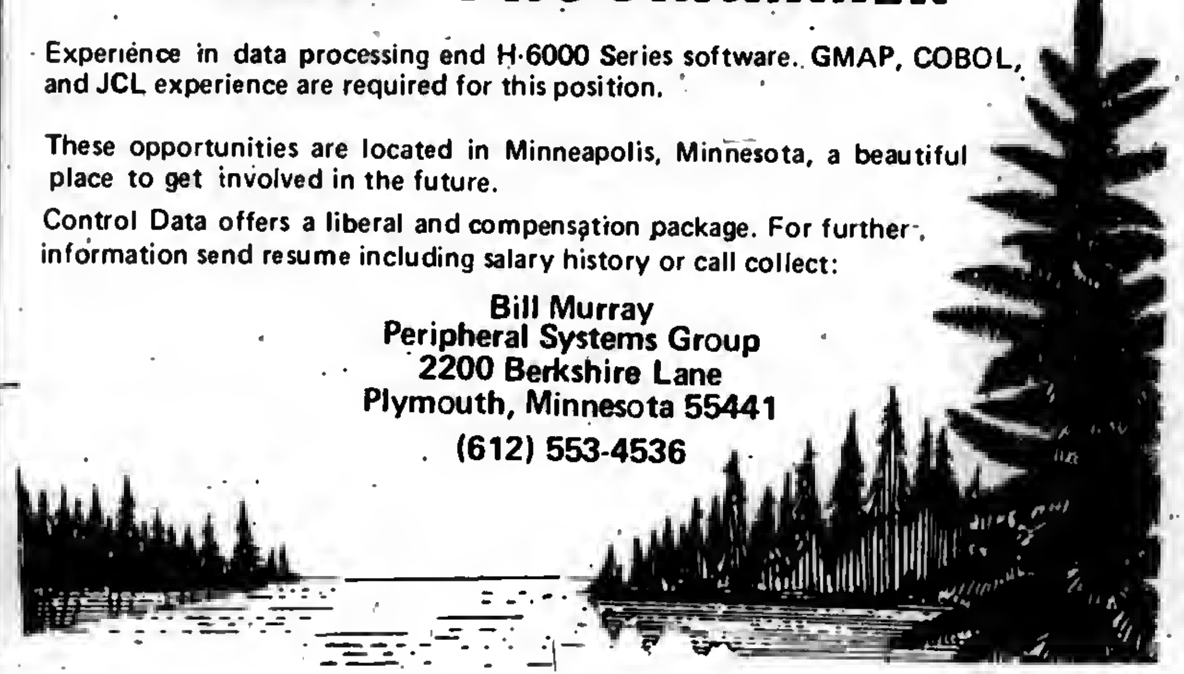

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Programmer/Analyst **To $20,000**
Accounting and manufacturing applications. Univac equipment.

Programmer/Analyst **To $20,000**
Systems programming experience. IBM or Univac (RCA) equipment.

Current employment will be protected. Send resumes, including present ond desired salary ond relocation preferences to: JIM STAAL, Mgr. Information Systems Division

Whitlow & Associates

3390 Peachtree Rd. NE – Suite 438
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404/262-2566

MODCOMP

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MODCOMP

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OataPhase Systems Inc., a rapidly-growing leader in interactive database applications, has several challenging positions on its software staff. Responsibilities include system development and implementation, field support, and interfacing with vendors and customers. Limited travel. Two year's active experience in programming, including experience with MUMPS or MIIS, would be preferable, as well as familiarity with minicomputer systems. Good communication skills required.

We offer an excellent salary and benefits program, with exciting opportunities for personal and professional growth.

Please call or write in confidence to:

Mr. Lloyd F. Botway
Manager, Systems and Development
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4528 Belleview
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FLORIDA COAST

Our client, a leader in the dynamic health care field, seeks DP professionals for newly created positions. Opptys req solid technical & personal qualifications. Degrees helpful, but not mandatory.

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To $21,000. Need several. Reqs min 2 yrs COBOL prog bkgd using IBS Oata Base Access methods combined w/1 yr OBO, PSB & ACB bkgd, IMS systems generation exp desirable.

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To $20,000. Reqs min 3 yrs prog bkgd utilizing Random Access File Structures, combined w/1 yr Pure Systems design.

SYS PROGRAMMERS

To $19,000. Need several, Reqs 2 yrs Systems Prog in DS/MVT, VS2R1 (SVS) or VS2R2 (MVS). Exposure to IMS DB/OC & CICS desirable.

PROG/ANALYST

To $16,000. Need several. Reqs min 2 yrs COBOL programming with knowledge of OS/MVS/JCL. Exp w/CICS a plus. All fees paid, including interview & relocation expenses to highly attractive Florida coast area. Reply in conf to J. Schwab, (704) 527-4980 or send resume to

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DATA PROCESSING OPPORTUNITIES

Hare is your opportunity to join Ryder Truck Rental, Inc., leaders in the transportation industry. We have a large scala computer/telecommunications system (370/168, DB/DC, IMS/VS). We are seeking qualified individuals in the following capacitias:

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Minimum 5 years' experiance in data processing. The successful candidata must heva a college degree and experience in tha following areas:

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Requiras 2 years' experianca. Assist in the installation and maintananca of S/370 software packages. Must have working knowledge of the following es relatad to the support of computer operetions: HASP or JES2, OS/JCL, background in performing studies and projects, and knowledge of debugging and parformanca evaluetion tools (i.a. SMF).

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Minimum 2 yaars' axperienca using COBOL and OS/JCL in large IBM systems environment. Knowledge of on-lina systems, 3270 CRT's TSO, IMS, end a college degraa all desirabla.

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Must have sound experiance in this area. Programming experience halpful. Will take full charge of total projact.

If you feel you possess the background to join a successful professional taam and desire an atmosphera of challange and latitude to express your ideas in a growing MIS operetion, please send resume to:

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Will have project budget rasponsibility and manage the davalopment of a distributad complax of microprocassor based computers end large central computars used for plant information and process control in nuclear power plants.

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Responsibilities in the following areas: design, document and debug firmware for interface between a distributed multiplexer and memory of high performence computer; firmwara for intalligent ports to a file oriented bulk memory system; a microassembler for above tasks.

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responsibilities include coordinating and participating in installation of computer hardware and software, troubleshooting computer operating system problems and multi-vendor hardware problems. Knowledge of HASP 4 or MVS and JES2 required. Currently running SVS; will be converting to MVS.

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Responsible for management of personnel and work of University Gift Records Office; analysis, design, maintenance and development in COBOL for computer systems and programs of offices of development and alumni affairs. Prepare progress, status, statistical reports, and analysis and presentation of materials. Maintain current working knowledge of pertinent advances in computer field. Accounting, on-line, and mass mailing application experience helpful. Qualifications: 2-4 years college plus 3-6 years programming and systems analysis experience, or equivalent combination of education, training and experience. Fringe benefits excellent. Salary commensurate with experience. Send resume to Box 57V, Waterman Building, University of Vermont, Burlington, Vermont 05401.

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Our aggressive Management Information Systems staff is seeking programmer analysts to join our corporate headquarters in Phoenix. We provide a professional environment which encourages new ideas and concepts in program applications and requires heavy interface with user departments.

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Stemmons Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W. 7th Ave.
Miami, Florida 33169

HARTFORD
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
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Minneapolis, Minnesota 55402

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Botal Associates, Inc.
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New York, New York 10017

NORTH CAROLINA
TaskForce, Inc.
1048 E. Wendover Ave
P.O. Box 6888
Greensboro, N. Carolina 27405

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Systems Personnel
207 Fox Lane
Wallingford, Pa. 19086

PITTSBURGH
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428 Forbes Avenue
Pittsburgh, Pennsylvania 15218

SAN FRANCISCO
The Computer Resources Group Agency, Inc.
303 Sacramento Street
San Francisco, California 84111

SYRACUSE
CFA Associates Personnel, Inc. (Agency)
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Syracuse, New York 13206

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- JES 3
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- TSO/TCAM

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Like customer contact? Amdahl needs:

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Please direct your response to Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 and indicate 310-D on your resume or letter. We are, of course, an equal opportunity employer.

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Must have own car.

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We feel these taks can best be performed by someone who has had some experience in system performance evaluation and transaction processing systems. Knowledge of, or work with; synthetic benchmarks, data processing systems and system performance instrumentation would be an asset.

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Please send your resume with some indication of salary history and current requirements to Thom Harris for careful consideration.

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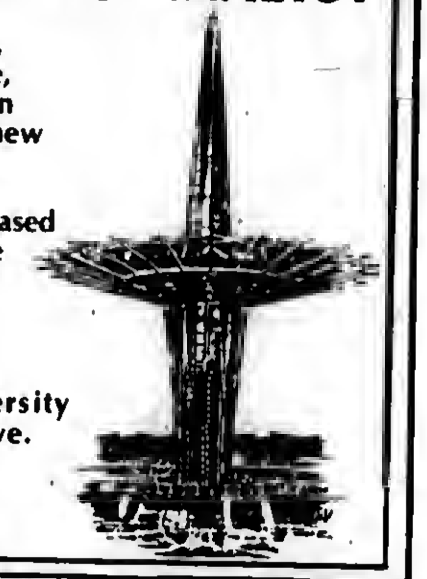
COMPUTER SYSTEMS ANALYST



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JR. SYSTEMS ANALYST/PROGRAMMER

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UNISTRUT CORPORATION
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Programmers

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TECHNICAL SUPPORT SPECIALIST

Intersil Incorporated, the leader in large scale semiconductor add-on memory systems, has an immediate, excellent opportunity for a European national to provide technical engineering support to our customers in the European marketplace.

To qualify, you should have IBM systems 360/370 hardware support experience plus thorough knowledge of IBM CPU diagnostic usage. Working knowledge of IBM CPU diagnostic usage. Working knowledge of software and/or training helpful.

For immediate consideration, please send your resume to Intersil Employment, 10900 N. Tantau, Cupertino, CA 95014. An Equal Opportunity Employer M/F.

INTERSIL

FPL
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Minimum of three years experience in IBM Operating System software (OS-VS2) in a medium or large system environment. IMS, VTAM, SDLC, CICS, and MVS experience is preferred.

PROGRAMMERS

Minimum of two years programming experience in COBOL or BAL in an IBM 360/370 environment. CICS, IMS/DL-1 experience and a Bachelors Degree in Mathematics, Engineering or Business are preferred.

ENGINEERING PROGRAMMERS

Assembly language programmers with Real-Time Data Acquisition experience. Two years' experience and Electrical Engineering Degree or equivalent preferred.

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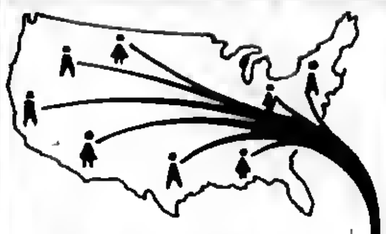

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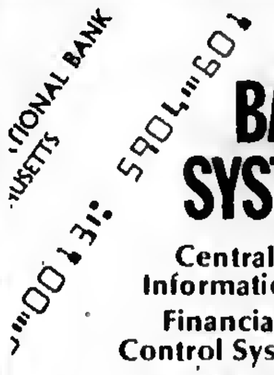

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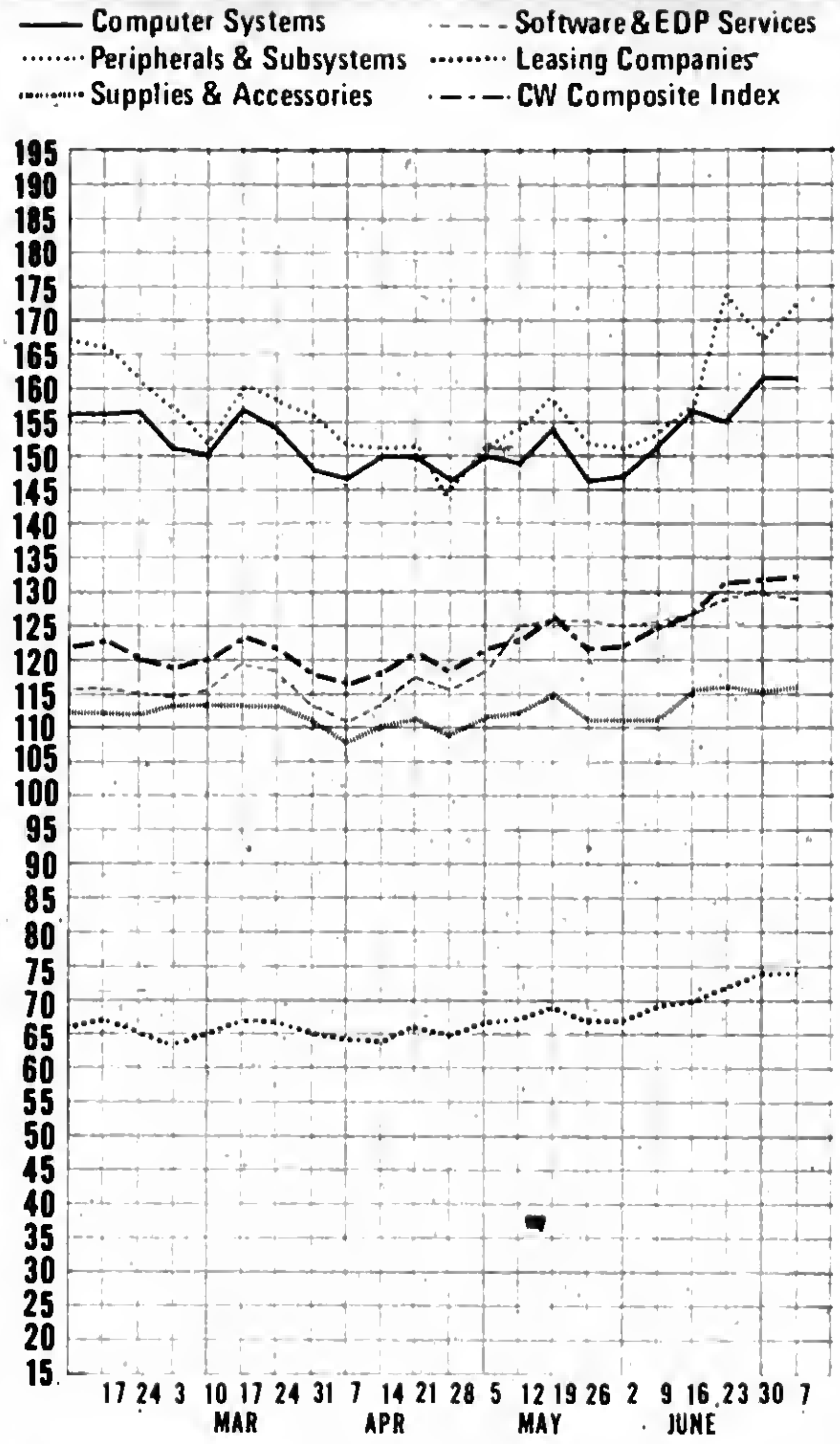

Earnings Reports

COMTEN

Three Months Ended April 1

	1977	1976
Shr Ernd	$.16	$.05
Revenue	7,175,000	5,390,000
Tax Cred	118,000	40,000
Earnings	407,000	127,000

DIGICON

Three Months Ended April 30

	1977	1976
Shr Ernd	$.07	.....
Revenue	5,977,000	$5,409,000
Earnings	151,000	(546,000)
9 Mo Shr	.....	.03
Revenue	17,339,000	19,166,000
Tax Cred	.....	61,000
Earnings	(140,000)	53,000

DIGITAL EQUIPMENT

Three Months Ended April 2

	1977	1976
Shr Ernd	$.72	e$.51
Revenue	262,727,000	191,234,000
Earnings	27,991,000	18,922,000
9 Mo Shr	1.73	a1.26
Revenue	726,269,000	504,293,000
Earnings	67,392,000	46,586,000

e-Adjusted to reflect three-for-one stock split in November 1976.

EG&G

Three Months Ended April 3

	1977	1976
Shr Ernd	$.30	$.23
Revenue	61,955,000	49,975,000
Earnings	2,136,000	1,636,000

e-Restated.

FAIRCHILD CAMERA AND INSTRUMENT

Three Months Ended April 3

	1977	1976
Shr Ernd	$.41	$.04
Revenue	117,103,000	96,616,000
Earnings	2,229,000	197,000

ELECTRONIC MEMORIES & MAGNETICS

Three Months Ended April 2

	1977	1976
Shr Ernd	$.13	$.02
Revenue	23,364,000	20,642,000
Earnings	984,000	394,000

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 6, 1977

All statistics compiled,
computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE: 1977 RANGE (1)	CLOSE JULY 6 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	0- 39	26 1/4	+ 1/4	+0.9
N	BURROUGHS CORP	55- 91	61 3/8	- 1/4	-0.4
O	COMPUTER AUTOMATION	18- 28	26 1/2	+ 1/2	+1.9
N	CONTROL DATA CORP	20- 26	20 7/8	- 5/8	-2.9
N	DATA GENERAL CORP	35- 47	44 1/4	-1 1/8	-2.4
N	DATAPOINT CORP	18- 30	25 1/4	-1 3/4	-6.4
N	DIGITAL EQUIPMENT	37- 53	45 3/8	-1 7/8	-3.9
N	ELECTRONIC ASSOC.	2- 3	2	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	8 1/2	+ 1/4	+3.0
O	FOUR-PHASE SYSTEMS	13- 17	15 3/8	0	0.0
N	FOXBORO	42- 54	50 3/8	- 1/4	-0.4
O	GENERAL AUTOMATION	6- 9	7 5/8	+ 5/8	+8.9
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	69- 87	79 1/8	+ 3/8	+0.4
N	HONEYWELL INC	44- 55	53 3/4	- 1/8	-0.2
N	IBM	245-286	259 7/8	-5 3/8	-2.0
O	MANAGEMENT ASSIST	5- 9	6 1/8	- 1/4	-3.9
C	MEMOREX	23- 29	25 3/8	+1 1/4	+5.1
O	MICRODATA CORP	7- 18	9 1/4	- 1/4	-2.6
O	MODULAR COMPUTER SYS	5- 8	7 1/2	- 1/8	-1.6
N	NCR	32- 38	36 3/4	- 1/8	-0.3
O	PRIME COMPUTER INC	12- 17	16	+ 1/4	+1.5
N	PERKIN-ELMER	17- 22	20 7/8	+ 1/4	+1.2
N	RAYTHEON CO	16- 33	30	- 5/8	-2.0
N	SPERRY RAND	34- 42	36 1/8	- 7/8	-2.3
C	SYCOR INC	6- 15	10 3/4	0	0.0
A	SYSTEMS ENG. LABS	5- 7	7 1/4	+1 1/4	+20.8
N	VARIAN ASSOCIATES	15- 21	19	-1 1/4	-6.1
A	WANG LABS.	14- 18	16 3/4	- 1/4	-1.4

LEASING COMPANIES

EXCH		PRICE: 1977 RANGE (1)	CLOSE JULY 6 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	BOOTHE COURIER CORP	8- 10	9 1/4	0	0.0
O	COMDISCO INC	10- 13	10 1/4	+ 1/4	+2.5
A	COMMERCE GROUP CORP	2- 2	2	- 1/8	-5.8
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
M	DATRONIC RENTAL	1- 2	1	0	0.0
A	DCL INC	1- 2	2	+ 1/8	+6.6
N	OPF INC	6- 8	7 7/8	+ 1/8	+1.6
N	ITEL	13- 20	19 3/4	+2	+11.2
N	LEASCO CORP	19- 24	22 3/4	0	0.0
O	LEASPAC CORP	1- 2	1	+ 1/8	+14.2
C	NPC INC	0- 0	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	+ 1/8	+2.2
N	U.S. LEASING	10- 14	13 7/8	0	0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE: 1977 RANGE (1)	CLOSE JULY 6 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/4	0	0.0
C	ANACOMP INC	7- 9	8 7/8	0	0.0
A	APPLIED DATA RES.	5- 9	9	0	0.0
N	AUTOMATIC DATA PROC	23- 30	28	- 1/2	-1.7
C	COLEMAN AMERICAN COS	2- 2	1 3/4	- 1/8	-6.6
O	COMPU-SERV NETWORK	10- 15	12 1/2	0	0.0
C	COMP ELECTION SYSTMS	6- 9	9 1/4	+ 1/8	+1.3
C	COMPUTER HORIZONS	1- 1	1	- 1/4	-20.0
O	COMPUTER NETWORK	6- 7	6 3/8	+ 1/2	+8.5
N	COMPUTER SCIENCES	7- 9	8 1/8	+ 1/4	+3.1
C	COMPUTER TASK GROUP	1- 2	1 1/4	- 3/4	-37.5
C	COMPUTER USAGE	2- 3	1 1/2	- 1/8	-7.6
C	COMSHARE	5- 7	5 1/2	+ 3/4	+15.7
O	DATA DIMENSIONS INC	4- 5	3 1/2	- 1/8	-3.4
C	DATATAB	1- 2	1 7/8	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	19 1/2	0	0.0
O	INSYTE CORP	2- 3	1 7/8	0	0.0
C	IPS COMPUTER MARKIT.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	- 1/4	-6.8
C	KEYDATA CORP	2- 3	2	0	0.0
A	LOGICON	7- 17	17	- 1/4	-1.4
A	MANAGEMENT DATA	1- 2	1 1/2	+ 1/4	+20.0
A	NATIONAL CSS INC	19- 25	21 7/8	+ 7/8	+4.1
O	NATIONAL DATA CORP	4- 7	5 1/8	- 1/8	-2.3
A	ON LINE SYSTEMS INC	17- 22	18	- 1/8	-0.6
N	PLANNING RESEARCH	3- 5	4 1/2	+ 1/4	+5.8
C	PROGRAMMING & SYS	1- 1	5/8	0	0.0
C	RAPIDATA INC	2- 3	2 1/2	+ 1/4	+11.1
O	REYNOLDS & REYNOLD	17- 20	19 1/4	+ 1/2	+2.6
C	SCIENTIFIC COMPUTERS	1- 3	3 1/8	+ 1/8	+4.1
C	TYMSHARE INC	14- 21	20 1/2	+1 3/4	+9.3
A	URS SYSTEMS	4- 5	4 1/2	0	0.0
N	WYLY CORP	1- 2	1 1/8	- 1/8	-10.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE: 1977 RANGE (1)	CLOSE JULY 6 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	14 1/8	- 1/4	-1.7
O	ADVANCED MEMORY SYS	7- 9	8 5/8	+ 5/8	+7.8
N	AMPEX CORP	8- 10	10 1/4	0	0.0
O	ANDERSON JACOBSON	3- 4	4	+ 1/4	+6.6
N	APPLIED DIG DATA SYS	10- 16	13 1/2	- 3/4	-5.2
C	BEEHIVE INT'L	8- 12	9 1/2	+ 1/8	+1.3
A	BOLT,BERANEK & NEW	7- 8	6 3/4	- 1/8	-1.8
N	BUNKER-RAMO	8- 12	10 1/8	- 1/8	-1.2
A	CALCOMP	3- 5	3 1/8	+ 1/8	+4.1
C	CAMBRIDGE MEMORIES	1- 3	2 5/8	+ 3/8	+16.2
N	CENTRONICS DATA COMP	22- 29	26 3/4	+ 1/8	+0.4
C	COGNITRONICS	1- 1	1/2	- 1/8	-20.0
O	COMPUTER COMMUN.	5- 6	6 5/8	+ 1/4	+3.9
C	COMPUTER CONSOLES	4- 7	5 1/2	- 1/2	-8.3
A	COMPUTER EQUIPMENT	2- 3	3 1/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1	0	0.0
O	COMTEN	9- 13	11 1/4	- 1/2	-4.2
N	CONRAC CORP	19- 28	23 1/8	- 3/8	-1.5
O	DATA ACCESS SYSTEMS	4- 5	4	0	0.0
O	DATA 100	6- 8	7 1/2	+ 3/4	+11.1
A	DATA PRODUCTS CORP	9- 13	17 5/8	0	0.0
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUM INC	1- 2	1 1/2	- 1/8	-7.6
O	DECISION DATA COMPUT	2- 2	2 3/8	+ 1/8	+5.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	4 1/8	+ 3/8	+10.0
O	FABRI-TEK	1- 2	1 1/8	-	-5.3
O	GENERAL COMPUTER SYS	0- 2	1 3/8	0	0.0
N	HAZELTINE CORP	9- 12	9 5/8	- 1/8	-1.2
N	HARRIS CORP	28- 39	37 1/4	+ 1/4	+0.6
A	INCOTERM CORP	11- 15	11 1/2	- 1/4	-2.1
O	INFOREX INC	4- 7	5 1/4	+ 3/4	+16.6
O	INFORMATION INTL INC	9- 14	10 1/2	+1 1/4	+13.5
O	INTEL CORP	38- 57	48	- 1/2	-1.0
A	LUNDY ELECTRONICS	3- 6	5 1/8	+ 3/4	+17.1
O	MSI DATA CORP	6- 10	9 1/2	+ 1/8	+1.3
N	MOHAWK DATA SCI	5- 8	5 3/8	- 1/4	-4.4
O	PENRIL CORP	2- 5	4 1/2	+ 1/8	+2.8
A	PERTEC CORP	7- 9	8 1/4	- 1/8	-1.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 5/8	- 1/4	-6.4
C	RECOGNITION EQUIP	6- 10	8 5/8	+ 1/8	+1.4
O	SCAN DATA	1- 2	1 5/8	+	+3.8
O	STORAGE TECHNOLOGY	10- 15	12 7/8	-1 3/4	-11.9
C	T BAR INC	7- 11	10 7/8	+ 1/2	+4.8
O	TALLY CORP.	4- 6	4	- 1/8	-3.0
C	TEC INC	7- 10	8 3/4	- 1/8	-1.4
N	TEKTRONIX INC	29- 36	35 3/4	+ 3/4	+2.1
N	TELEX	2- 3	2 5/8	- 1/4	-8.6
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE: 1977 RANGE (1)	CLOSE JULY 6 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 3/4	0	0.0
A	BARRY WRIGHT	10- 14	13 1/8	- 1/8	-0.9
O	CYBERMATICS INC	1- 1	5/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 18	16 3/4	0	0.0
N	ENNIS BUS. FORMS	6- 7	6 1/8	- 1/8	-2.0
C	GRAHAM MAGNETICS	11- 15	14 3/4	+1 1/4	+9.2
O	GRAPHIC CONTROLS	15- 18	16 1/2	0	0.0
N	3M COMPANY	48- 56	48 1/2	-1 1/8	-2.2
C	MOORE CORP LTD	28- 37	28 1/2	+ 1/4	+0.8
N	NASHUA CORP	16- 22	22	+1 1/4	+6.0
O	STANDARD REGISTER	18- 25	22 1/4	- 1/4	-1.1
O	TAB PRODUCTS CO	13- 17	16 1/4	+ 1/4	+1.5
N	UARCO	19- 22	20 1/4	0	0.0
A	WABASH MAGNETICS	10- 15	13 7/8	- 1/8	-0.8
N	WALLACE BUS FORMS	17- 21	18 1/8	+ 3/8	+2.1

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NEWSPAPER

Caution: CRTs May Be Eye Hazard

By John P. Hebert
Of the CW Staff

There are thousands of people currently using display terminals in this country. Some of them may unavoidably fall asleep doing their jobs – and not because they had one too many the night before.

Eyestrain is the culprit, according to Dr. Jeryl Sparks, a Dallas optometrist who said his office is frequented by Texas Instruments, Inc. and Collins Radio Co. employees who use CRT terminals in their jobs each day.

Although the problems of a loss in visual clarity and soreness and swelling of the eyes are shared by people in any job requiring "detail" work, a few could be caused by the terminals or the places in which they are found, according to Sparks.

His observations are supported by a study of CRT operators in Europe published by Air France.

As of December 1976, there were 58,000 conversational CRT terminals and 294,500 editing CRTs in use in this country, according to figures published by International Data Corp. in a recent study on data entry and data communications equipment.

These figures are probably slightly higher now, according to a spokesman for the market research firm. It is unknown, however, how many CRT users actually suffer eye problems.

The elements contributing to eye discomfort could range from the brightly lit air-conditioned offices where the terminals are located to glare from the devices' reflective faceplate and the dot-matrix characters displayed on the screens.

(Continued on Page 6)

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CW Photo by E. Holmes

President Carter, flanked by privacy commissioners, reaches for report.

Carter Pledges Influence To Develop Privacy Policy

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – President Carter pledged last week to use his "Influence as President" to help develop a national policy governing the treatment of personal records in public and private data banks.

The pledge was made at a meeting in the White House Cabinet Room last Tuesday morning with David F. Linowes, chairman of the Privacy Protection Study Commission, and members of his staff. At that meeting, the fruits of the commission's two years of work were formally presented.

Carter agreed to discuss the study with his Cabinet members at a meeting today and ask them to read the commission's 638-page report.

And on Capitol Hill reaction to the report was swift. As many as 11 separate bills were offered to help turn the commission's recommendations into reality.

The Privacy Protection Study Commission was established by the Privacy Act of 1974 to study whether the business community should be required to protect the confidentiality of records they maintain on individuals.

At a joint hearing of the Senate Committee on Governmental Affairs and the House Government Operations Committee's Subcommittee on Government Information and Individual Rights, Rep. Barry M. Goldwater Jr. (R-Calif.) and Rep. Edward I. Koch (D-N.Y.) – both commission members – gave "legislative expression" to the privacy group's recommendations.

This took the form of 10 separate bills that Goldwater said he hoped will "ultimately be incorporated into the Omnibus Privacy Act of 1977."

The bills, designed to provide privacy guidance for the private sector and to clarify the government's role in assuring that privacy, deal with consumer and commercial credit, banking, insurance and medical records, the Social Security num-

(Continued on Page 4)

Firmware Lets Mini Emulate IBM 370

RANDALLSTOWN, Md. – Interdata 7/32 minicomputers can now be outfitted with firmware that allows them to emulate IBM 370 mainframes, according to the developers of the firmware, Kardios Systems Corp.

With the enhancement, the Interdata system can run any of the IBM 370's applications programs, according to the Kardios spokesman.

The company is making the firmware available to present 7/32 users or will offer its own version of a configured 7/32, the Duo 70, complete with the firmware enhancement.

When outfitted with the enhancement, the system can run both Interdata applications programs under the Interdata instruction set and IBM application programs under the IBM instruction sets, the spokesman explained. The firmware can include a Basic Assembly Language (BAL) instruction set, commercial instruction set and a scientific instruction set.

Upgrading from the Interdata 7/32 to the Duo 70 takes about a day, the company noted, and Interdata will maintain the system with the enhancement.

In a job stream, the system will switch back and forth from applications written under Interdata to those written under IBM. The firmware runs under Interdata's OS/32 MT multitasking operating system, in two distinct operating modes, the spokesman added.

The Duo 70 costs $15,000 plus the cost of an Interdata 7/32 system configuration for the enhancement including the BAL instruction set. The commercial instruction sets and scientific sets have not yet been priced, a spokesman noted, but delivery can be 60 days after receipt of order. Kardios Systems Corp. is at 3820 Courtleigh Drive, Randallstown, Md. 21133

New Yorkers' Systems Hit Hard By Mid-Week Lightning Storm

NEW YORK – Computer systems were hit hard here last week when a lightning bolt knocked out a Consolidated Edison power substation, shutting down the utility's service to 2.7 million customers.

More than 3,300 computer centers were in the affected area, but at press time it was difficult to determine how many had been operating when the power went off at 9:33 p.m. on Wednesday.

But the reliance of business and industry on computer systems and the impact of such systems on the public was evident in the crisis.

With the shutdown last week, for example, all types of reservation systems – from airlines to hotels – were crippled, stranding travelers with and without reservations.

At both the Holiday Inn and the Sheraton Hotels the personnel could not make reservations – or confirm those already made – even at hotels in New Jersey, which was not affected by the outage.

All of those hotels' reservation systems operate through switches in New York and with switches down, reservations were

(Continued on Page 4)

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IBM Break-Up Seen as Only Solution

By Catherine Arnst
Of the CW Staff

NEW YORK – The only way to remove IBM's monopoly power over the computer industry is through divestiture, according to Dr. Alan K. McAdams, chief economic adviser to the Justice Department's trial team in the U.S. vs. IBM antitrust suit.

That is precisely the remedy the Justice Department plans to recommend if it wins the suit, according to Justice Department attorney Lewis Bernstein.

Without divestiture, there is very little that can be done to prevent further anticompetitive practices by the firm, McAdams testisfied at the trial recently.

"No institution is capable of monitoring IBM" in a manner that would allow competition to grow because of the complexity of the industry and IBM's ability to take disadvantages and change them into advantages, he added.

"I see no threat to IBM's monopoly position at this time [from existing competitors] . . . In order to affect behavior which limits competition you must remove the power that IBM has . . . The only mechanism capable of achieving that is to go to the heart of IBM's power – the general-purpose computer systems market," McAdams said.

IBM has been able to maintain its monopoly power because it dominates both the general systems and the plug-compatible peripherals market, the Cornell University economics professor explained. IBM was able to offset losses in one market by raising prices in the other and "the user received no benefits from such market control," he said.

Fixed-Term Lease Plan

Examples he gave included IBM's Fixed-Term Lease Plan (FTP) instituted in May 1971. The FTP offered low rental prices to users who signed on for long-term leases, but it penalized those who cancelled before the lease termination date.

The IBM task force that recommended the FTP forecast it would cause a revenue reduction of more than $75 million in 1971 to 1972. In order to recoup its losses, IBM announced price increases on CPUs and other portions of the system not covered by the FTP in July 1971 (which didn't go into effect until July 1972 because of the price freeze at that time), the prosecution's pretrial brief stated.

A 'Wash'

In August 1971, IBM predicted that "the net effect of the FTP and (CPU) price changes will be a wash insofar as business volumes are concerned," an internal IBM document said.

IBM could also change the interface design of its CPU to undermine competition in the peripherals market – another example McAdams gave of the firm's ability to dominate one market through its dominance of another.

This was a favorite strategy with the 370 systems line, all the components of which IBM originally intended to be fully interchangeable, McAdams testified.

The result of the several changes was "a great proliferation of interfaces" with accompanying inventory control problems for IBM and an undoing of the benefits interchangeability offered users, he said.

Interlocking Strategies

The FTP and the interface changes are two of the interlocking strategies IBM orchestrated to erect barriers to entry into both the general-purpose and the peripherals markets, McAdams said.

He illustrated the effectiveness of these barriers with a case study of General Electric's (GE) attempts to enter the general systems market. A test of whether a market is truly competitive is the ease of both entry and exit, McAdams said.

GE decided to enter the systems market in the late 1950s, and a feasibility study predicted its first break-even year would be 1976, McAdams said. Before it reached that point, howver, the study determined the firm could expect to incur before-tax losses of $250 million.

The only type of company which could sustain such losses is one that operates in several markets, as GE does, McAdams said. Consequently, the firm, which ranked ninth in the Fortune 500 list, was willing to go head-to-head with IBM on a systems basis, he testified.

GE and IBM development activities paralleled each other, McAdams said. Both attempted to develop a comprehensive time-sharing system data base management system. Both had the same degree of difficulty achieving those goals.

The difference was that IBM showed substantial profits while GE suffered substantial losses.

IBM could use its dominance in the peripherals market to offset its losses in the systems area and was able to "outpromise" GE; when both parties failed, the advantage reverted to IBM, he concluded.

When GE quit the business the user and the industry lost a highly innovative firm that was willing to take risks in its development efforts, McAdams said.

IBM Memo: 'A Smoking Gun'?

By Catherine Arnst
Of the CW Staff

NEW YORK – A 1968 memo indicating IBM was aware actions it was taking could be regarded as anticompetitive was introduced here recently in the government's antitrust case against the firm.

The memorandum, which IBM considered "privileged" and fought to keep out the case for nearly two years, concerned its introduction of the 370/155 – a system the government contends IBM announced to contain any threat a Memorex computer system might possess.

Described as a "smoking gun" by several members of the Justice Department team, the document is one of 14,000 ruled not warranting privilege claims.

The two-paragraph internal memo from the general counsel of IBM's Data Processing Group to the assistant general manager and senior vice-president of that group, dated Sept. 23, 1968, states: "If the [370/155] announcement is in any way accelerated, it is vitally important that no anticompetitive motive be spread in the files.

"I have alerted Mr. Wunderli, Systems Development Division counsel, to handle this with Mr. Branscomb, but it is of even greater significance that our files be clean."

At the top of the memo is the legend: "privileged communication – to be kept in a segregated file and not to be summarized or reproduced without permission of the law department."

According to testimony by Dr. Alan K. McAdams, the prosecution's head economic advisor, the memo offers one hypothesis of why no IBM analyses of Memorex's general-purpose computer system were available to the government.

IBM had conducted extensive studies of Memorex's entrance into the plug-compatible peripherals market with disk drives that were widely accepted and considered generally superior to IBM products, McAdams testified. This, he indicated, was based on IBM documents previously available to the government, and "I was very surprised no such analyses relating to the Memorex computer system were found," McAdams said.

Memorex's entry into the general-purpose computer systems market "would have been taken very seriously by IBM," making it even more unusual that no analyses of that aspect of a potential competitor's business was found, he added.

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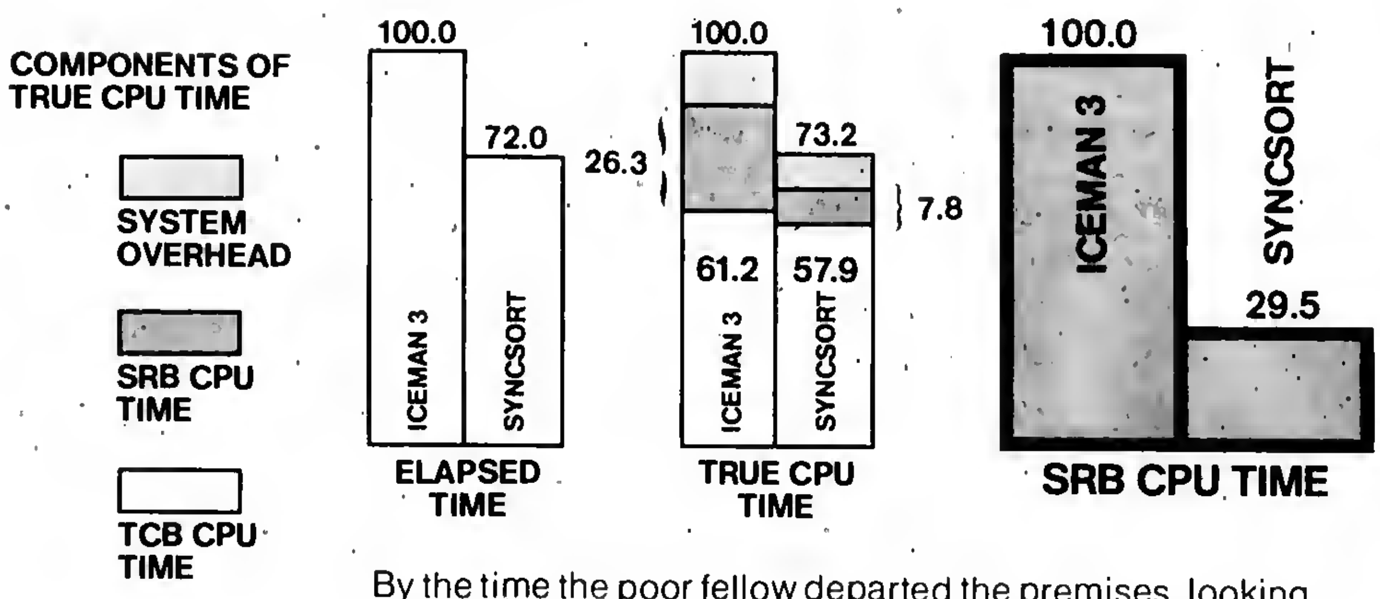
Take the incident that occurred a few weeks ago in a data-processing center that Must Remain Nameless.

In came a very nice, very upstanding IBM representative. His intent was to prove, once and for all, that IBM's new SM1-5740, Release 3, was superior to Whitlow's SyncSort III-and-a-half.

As the sun sank slowly in the west, the IBMer rolled up his sleeves and set to work. Benchmark followed benchmark. Hours passed. Results began to emerge. Inevitably, they looked like this:



By the time the poor fellow departed the premises, looking a bit crestfallen, even he was admitting that SyncSort was probably the data-processor's best bet.

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Paris: CAP/SOGETI PRODUITS
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Privacy Principles Ignore Global Needs

By G. Russell Pipe

Special to Computerworld

AMSTERDAM, The Netherlands – Opponents of strong, comprehensive private-sector privacy legislation may have won a major victory in the U.S., but framers of European privacy laws are likely to be sorely disappointed.

Analysis

The 600-page privacy study containing scores of policy recommendations appears oblivious to the labors of some 18 countries working on nearly identical issues. Indeed the extensive elaboration of legal reforms needed in personal data practices, tepid as they are, may seem to be a stamp of disapproval of American recordkeeping.

Europeans expected an extension of the Privacy Act of 1974, albeit with modifications, to give blanket coverage over personal records maintained by commercial organizations. Most countries of Scandinavia, Central Europe and the UK are approaching privacy by framing laws of general application, usually a single statute for public and private records. This has become a sine qua non for transfer of data between countries.

Without common basic rules, such as the Swedish and German laws provide, the U.S. DP industry will have to rely on congressional action in some 14 fields.

Because the commission saw a need for specific recommendations in these areas, European officials are likely to take this as evidence of deficiencies in collection, maintenance, use or dissemination practices which, they believe, must follow their data wherever it is located. Thus, until separate medical, banking, insurance, personnel record and other sectoral laws are enacted, some foreign governments may contend that the absence of protection should result in restricting personal data sent to the U.S.

The scantily detailed Federal Privacy Board proposal would not meet even minimum objectives of most such bodies being considered by other countries. The likelihood that such an American board would meet basic reciprocity requirements is, at most, wishful. Further, since such a board would be limited to monitoring federal agency activities, leaving the private sector unshepherded, a large gap exists in the jurisdiction it would have with European counterparts.

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Carter Pledges Support

(Continued from Page 1)

ber, Internal Revenue Service records, public assistance, social services and government access to personal information.

Not to be outdone, Sen. Birch Bayh (D-Ind.), who chairs the Senate Judiciary Committee's Constitutional Subcommittee, also chose the day the privacy commission's report was released to introduce legislation designed to prevent the indiscriminate use of polygraph tests by government and private enterprise employers. His subcommittee will soon hold hearings on this "Polygraph Control and Civil Liberties Protection Act," Bayh promised.

Sen. Charles H. Percy (R-Ill.) summed up the mood in the Capitol concerning the commission's report when he observed during the hearing that "privacy makes strange bedfellows . . . It is an issue that cuts across ideologies."

Linowes repeatedly expressed his appreciation for the enthusiastic response to the report, entitled "Personal Privacy in an Information Society." He added his hope that that response would be just the beginning of "vigorous and quick action" on the part of the President and the Congress to rectify "some of the systematic problems" identified in the commission's 162 recommendations.

Referring to the Koch-Goldwater bills, Linowes noted that "a single sweeping solution to the privacy problems this nation faces won't do justice to our economy." Accordingly, the report's recommendations and their attendant legislation seeks "to keep clearly in mind" the diversity of the institutions, records and rights of individuals involved.

Tailored to Specific Industries

While privacy laws for each area of the economy will be tailored to specific industries under the commission's plan, certain guiding privacy principles will be found in all this legislation, the chairman added [CW, May 9].

These principles include the right of an individual to see, copy and correct his record and the right to authorize an organization to transfer the information it has about him, Linowes said.

Organizations – public or private – should use personal information only for the purpose for which it was collected, he stated. In addition, they should collect only that information which is relevant to the decision being made.

Organizations would also be expected to put an end to secret records and holding investigative interviews under false pretenses, Linowes stressed.

If these principles are followed, the nation will go a long way toward preventing unwarranted intrusion into an individual's private affairs and keeping inaccurate records from causing unfair decisions about an individual. It should also help protect the individual's interest in disclosures made from records about him, the commission's report stated.

The privacy commission concluded that Congress should not apply the specific requirements of the Privacy Act of 1974 outside the federal government. Instead, Congress and state governments should mandate access and correction rights tailored to particular types of recordkeeping relationships as proposed in the Koch-Goldwater bills.

The commission intends, through a mixture of legislation, regulations and voluntary compliance, "to tell society how it expects it to behave and then leave it alone as to the details by which it reaches privacy answers," Commissioner William O. Bailey said.

"We have no desire to bind private institutions into a straightjacket of rules and regulations," the insurance company executive added.

There are only two areas of the private sector in which the commission recommends voluntary compliance with privacy guidelines, however. These are employment and mailing records, Linowes said.

A "legally enforceable expectation of confidentiality" should be applied to the records that credit grantors, banks, insurance companies and doctors and hospitals maintain about individuals, the commission concluded. Long-distance telephone records should also be covered.

"We aren't saying the government doesn't have a legitimate interest in examining records on an individual in some instances," Linowes noted. "But the individual should have the right to protect that record. The government shouldn't be allowed to conduct a fishing expedition."

The chairman maintained there are "no burdensome costs" in any of the commission's recommendations. While individuals would be able to seek damages for privacy infringements in the commission's scheme, the liability of the record keeper that complies with an individual's request for access to its records about him would also be limited.

"The commission wants organizations to invest in improving their recordkeeping practices, not to spend their money in costly litigation over past practices and honest mistakes," Linowes said.

The recommendation that the President and the Congress consider establishing an independent privacy "entity" to monitor the implementation of the commission's suggestions and to help streamline the federal privacy protection requirements that now apply to government agencies drew considerable comment and several questions from the senators and congressmen.

The commissioners stated they made this recommendation deliberately vague.

"The only message this commission wants to get across is that privacy is a phenomenon that should be dealt with in a centralized fashion," Linowes stated.

Added Bailey: "We've been very specific about the functions this board would have." Among that entity's functions would be advocating privacy, giving the issue "front burner concern," he said.

Commission vice-chairman Dr. Willis H. Ware noted that much has been accomplished in the past two years by the Privacy Protection Study Commission operating with a staff of 25 people. "The entity we have in mind would involve tens of people – not hundreds or thousands," he stated.

In the course of its study, the seven-member commission held 60 days of hearings and meetings and took testimony from more than 300 witnesses including credit-card issuers, banks, department stores, mail-order firms, insurance companies, educational institutions, doctors, hospitals and federal agencies, including the Justice Department and IRS.

New York Systems Hit By Blackout

(Continued from Page 1)

impossible. Without any written backup of reservations made, confirmations were also impossible.

When the blackout occurred, the computerized radar systems used to control air traffic at Newark, Kennedy and LaGuardia Airports switched automatically to stand-by gasoline turbine generators, and air traffic radar control was uninterrupted, according to an FAA spokesman.

Some ground facilities at the airport were knocked out, however, and both Kennedy and LaGuardia Airports were closed down temporarily by the Port Authority.

Elsewhere, even within the LaGuardia terminal buildings, all was in darkness, a traveler said.

During the great power blackout of 1965 when the entire east coast from Maine to Washington, D.C., was affected, there were few computer systems in operation that had a direct impact on the public.

Award 'Irregularities' The Issue

HEW Investigators Probe On-Line Systems' Contract

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – An internal investigation at the Department of Health, Education and Welfare (HEW) is probing how a computer services contract was awarded two years ago and if the winning bidder had an unfair advantage.

The investigation is centering on "possible favoritism, gratuities or other irregularities" in connection with the original contract award, and not particularly with the performance of work done under the pact, according to Robert Wilson, spokesman for the department's Inspector General.

Edwin B. Parker III has been relieved of his duties in connection with the Office of Education project covered by the contract. He has been "detailed to other duties at full salary pending completion of the investigation," Wilson added.

The project involves the automation of the Guaranteed Student Loan Management System under which HEW monitors the status of "millions of students, 8,000 post-secondary schools, 10,000 to 15,000 banks and loans amounting to some $10 billion," according to Parker's replacement, Maurice Tansey.

HEW auditors and investigators are also looking into the close relationship between Parker and Gilmore S. Wheeler, a consultant hired by On-Line Systems, Inc. (OLS) of Pittsburgh, to whom the contract was awarded in 1975, according to a report in the Detroit News.

An article in the *Wall Street Journal* quotes an unidentified HEW official as saying the probe is focused more on HEW employees than on the contractor. The department is concerned there may have been violations of its code of conduct for employees, he said.

Punishment could range from a reprimand to firing, the *Journal* added.

The Detroit News quoted OLS president Jack Roseman as saying he was "shocked" that the probe was "even referred to as an investigation.

"As far as I know it's just a review of our program to make sure everything is documented. We welcome that kind of review," he added.

OLS issued a statement earlier this month, acknowledging that HEW is conducting an "audit and investigation" of the procurement of the original contract and "certain OLS expenses, primarily related to business meals of [Office of Education] employees incurred during its term."

The company also "understands" HEW is investigating "certain other" contractors for similar reasons, the statement continued.

Wilson clearly disagreed with those assessments. "This certainly is an investigation. It is not a common thing. It is unique," he countered. He would not say, however, how many people are on the investigative team, how it is organized or how long the probe will last.

'Matter of Some Priority'

The investigation began two or three months ago and the department now senses that it is "a matter of some priority to get it done," he said, lending credence to estimates that the probe will wind up within months and "possibly within weeks now," in the words of one observer.

The Inspector General's office at HEW was created by Congress late last year and is organized as three groups, focusing on auditing, investigations and health care system reviews. *Detroit News* reporter Seth Kantor said both auditing and investigative groups were active in the probe.

The ties between Parker and Wheeler are social as well as professional, according to Kantor, who noted that the consultant served as best man at Parker's wedding in June.

That had no effect on the contract award two years ago, according to Wheeler, who told Kantor that Parker "insisted on withdrawing himself" from participating in the contract review at HEW which led to OLS getting the contract.

Wheeler admitted to Kantor, however, that one of the charges HEW is probing is that "information was supposed to have been advanced from inside HEW to On-Line before the bidding began." If true, that could have given OLS an advantage in making its presentation to HEW, Kantor noted.

The loan program started in 1969 and by 1975 there was a pressing need to get the automated management system up and running on equipment outside HEW since in-house facilities were already overworked, according to Tansey.

There was no time to develop custom software and the OLS proposal, involving the use of software capabilities the network already had in place, was the best of all that HEW received, he added.

Contract Terms

The contract, initially for one year but with two one-year extensions at the option of the government, covered adapting OLS software to the project needs and processing the work once the programs were ready. Both extensions have been exercised by HEW and the contract has amounted to a $7.5 million piece of business for OLS.

Essentially all of the system is operational now, tied to the On-Line data center in Pittsburgh, Tansey said. Development work continues, however, as the original programming is optimized to particular tasks and modified to meet changes in the law.

In an interview, OLS chairman John Godfrey took exception to news reports which focused on how the contract has grown in value. He said he was bothered, for example, by stories which compared the first year price of $1.6 million to the three-year figure of $7.5 million.

He also noted that OLS was able to implement the system faster than expected – "thanks to our software" – and production work, "which is absolutely essential if the government is to control the loan program," got started earlier than initially expected.

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Is 5x7 Dot-Matrix CRT Terminal Tomorrow's Endangered Species?

By John P. Hebert
Of the CW Staff

Could a CRT terminal that displays characters in a dot matrix format be on the endangered species list in the near future because it's hard to read?

Definitely not.

But although terminals with the 5 x 7 dot-matrix type of character generation are most widely used because these units are cheaper, other types of terminals are currently available, and at least two manufacturers are experimenting with still other alternatives.

Some commercially available models generate characters composed of a greater density of dots or use line segments or strokes for character generation.

Other terminals use plasma gas, light emitting diodes (LED) and liquid crystal media. However, these are limited to displays ranging from a few characters to a line or two – and rarely more than three dozen characters – according to a report on alphanumeric display terminals published by Datapro Research Corp.

Datagraphix Corp. introduced a relatively inexpensive display that utilizes fully formed characters at the National Computer Confernece, and IBM is experimenting with a laser beam technology.

Although the present dot-matrix display method is adequate for information reference, it can promote eye fatigue or strain for operators who use CRTs under the wrong lighting conditions and/or for extended time periods.

Fully formed characters are theoretically less fatiguing to read. But eye fatigue or its absence is also dependent on where the terminal is located and how much it is used at one time, optometrists agree.

If a CRT is used intermittently, the operator can get by with the standard 5 x 7 dot-matrix display. But full-time CRT operators using the same display might experience eye discomfort, as might the programmer who spends two hours in front of it in a brightly lit room.

Datagraphix spokesmen declined to comment on the new product.

Experimental Terminal

At IBM's San Jose, Calif., research laboratory, scientists who have built an experimental terminal to demonstrate the laser beam display technology suggested the laser beam terminal as a replacement for certain applications such as engineering graphics or newspaper page formatting.

For most applications, however, they also agreed the CRT terminal presently in use is here to stay.

The major drawback of CRTs, an IBM scientist said, is the cost barrier to displaying more than one million picture elements on a single screen. The laser-written displays do not have that limitation, the spokesman said.

Further, the laser-generated characters are more sharply defined than in CRT displays and appear black on a white background, giving the look of a typewritten page, according to IBM.

The technology utilized in the IBM experimental device has the potential to display characters in a 20 x 40 spot format, the IBM spokesman pointed out.

"We think we can put more elements on the same size screen," in addition to making the screen itself larger than the conventional CRT found in computer terminals, according to the researcher.

There is a drawback, however. This method of scanning takes the laser 50 milliseconds to form a character – or about 20 char./sec.

Although the speed is sufficient for entering information from a keyboard, it is much too slow for displaying information that is already stored in a computer, IBM admitted.

CRT-Bound Workers Strain Eyes

(Continued from Page 1)

Sparks said.

The people most affected by the terminals, he explained, are those who use the device day after day without any breaks. "They are asking too much of their eyes," he said.

The muscles of the eye are like any others – "If you run for 10 miles, your leg muscles will hurt.

"Some people are not suited for this kind of work," according to Sparks, who sees the problem as symptomatic of our society as a whole.

"This computerized world of ours is creating problems for our eyes. The population is becoming more and more nearsighted because more people are working in closed rooms and confined spaces," he said.

Recommendation to Doctors

Sparks believes doctors should observe and experience first-hand the conditions related to patient complaints. His travels through computer rooms and CRT terminal clusters have led him to some conclusions concerning those who use and manufacture the devices.

Vendors could come up with a better glass to prevent glare, he said. Employers should eliminate glare in offices and try to achieve a point of equilibrium between the brightness of the room and the brightness of the CRT screen.

Related to this is the use of the proper lighting on the screen. A CRT terminal should always display illuminated (light) characters on a dark background.

The dot-matrix print displayed on the terminal screen or found on a computer printout is "horrible," Sparks said. This type of character – generated by a wide variety of CRTs and computer printers – is very difficult on the eyes. The operator or printout reader must constantly try to bring the characters into focus, forcing the eyes to work harder, according to the doctor.

Breaks Suggested

For people who use the terminals, Sparks suggested they often look up from their work, take at least a couple of nonreading breaks during the day and blink their eyes.

Full blinking, he said, is very important because it ensures the eyes get necessary oxygen. Depriving the eyes of oxygen will cause them to swell, as it will any other body tissue, he added.

Apparently, there never has been a formal or informal U.S. study performed on the effects of CRT terminals on their operators.

Dr. Paul Lappin, dean of the New England College of Optometry in Boston, doesn't think working with a computer terminal is any more stressful for the eyes than reading a book.

"If you do it all day long, it will be fatiguing," Lappin said, but "there is nothing about the [CRT] per se" that contributes to eye stress any more than other close-work situations.

Old Question

The question of whether eyesight is adversely affected by such situations is an old one, Lappin said, recalling experiences with radar screen operators' complaints of fatigue.

"Eye fatigue in the radar operators was difficult to diagnose or even define," he explained.

Congressional DP Service Seen Enmeshed in Politics

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Politics inevitably becomes an element in the systems design of any DP effort which directly impacts members of Congress, according to Dr. Frank Ryan, former director of the House of Representatives Information Systems (HRIS).

Speaking at a conference of DP executives here recently, Ryan, who left HRIS to become director of athletics and a member of the mathematics faculty at Yale University, compared his old operation to a service bureau created to develop applications that would better serve Congress.

Service to Congress, however, is more an art than a science, Ryan said. He found the systems developed to meet particular problems of members of Congress during his tenure as HRIS director are valued by the Representatives for very different reasons.

The beginnings of HRIS itself are rooted in politics. When the idea of using computers in the House was first discussed in 1971, Wayne L. Hayes (D-Ohio) had just risen to become chairman of the Committee on House Administration and the number of telephone lines running into each member's office was the primary information issue, Ryan said.

HRIS was initially "a little vendetta" started under the Administration Committee as a result of a debate between Hayes and the Clerk of the House over who should be responsible for House DP, he stated.

Ryan, who played quarterback for the Cleveland Browns and then for the Washington Redskins, said he was thankful to have been in football before he got to the House. "There are anxious, hungry and tough people in the House as well as on the field," he explained.

When Ryan and his staff designed the House's electronic voting system, they thought that it would help Representatives vote faster. Used for the first time on Jan. 23, 1973 for a quorum call, the system, which runs on dual Control Data Corp. 1700 mainframes, saved approximately 500 hours of legislative time that would have been needed to answer roll calls without it.

'Strategy Devices'

But the Representatives liked the system for reasons other than its reduction of voting time from almost 45 minutes to 15 minutes. For example, the manual voting system had had a high instance of errors in recording votes.

It also permitted "ghost voting" by members not even in the Capitol when a vote on an issue was taken.

Today, members of Congress can look at almost any subset of Representatives whose votes they want to track using CDC terminals on the House floor and in their own offices. The CRTs have become "in-progress strategy devices," Ryan said. He added that the system has given the leadership in the House more control over its followers.

Members now vote about twice as much as they previously did, but gamesmanship has come into play in the casting of votes, the former HRIS director noted. The House has had an unprecedented set of tie votes, for example.

When the CRTs were first installed on the House floor, Ryan said, members reportedly sat at the terminals, pressing the buttons to change their votes back and forth and watching the changes register on the display panels located around the chamber.

Another system designed to track the status of legislation has been very popular, attracting approximately 1,200 phone calls on particular bills each day with a 2:1 busy signal ratio at the Bill Status Office, Ryan said. The system relieves congressional staff people from the tedious chore of following a bill through the legislative process.

Resistance to Comis

Still another system, the Committee Meeting Information System (Comis), intended to alleviate the high instance of schedule conflicts on a given legislative day, also has run into flack.

The problem is that the committees don't want other committees to know which of their rooms are available. The dynamic scheduling system would have all committees report the meetings they plan to a central data base that would help staff workers assigned to arrange meetings avoid conflicts.

HRIS has tried to get the committees to use Comis for two years. In addition to not participating in the system, the committees have also created "ghost meetings." HRIS is now trying to bring committee meeting information together without room information, Ryan said.

Explaining HRIS' current effort to develop a communications network with a terminal in every member's office, Ryan said when they have their own devices, they're "generally happy, regardless of what they do."

He cautioned DP professionals to be aware of the perception Congress has of computing.

Representatives will look at issues in the industry, like those involved in the Consumer Communications Reform Act — better known as the Bell Bill — with the same understanding of DP that they have in their own environment, he said.

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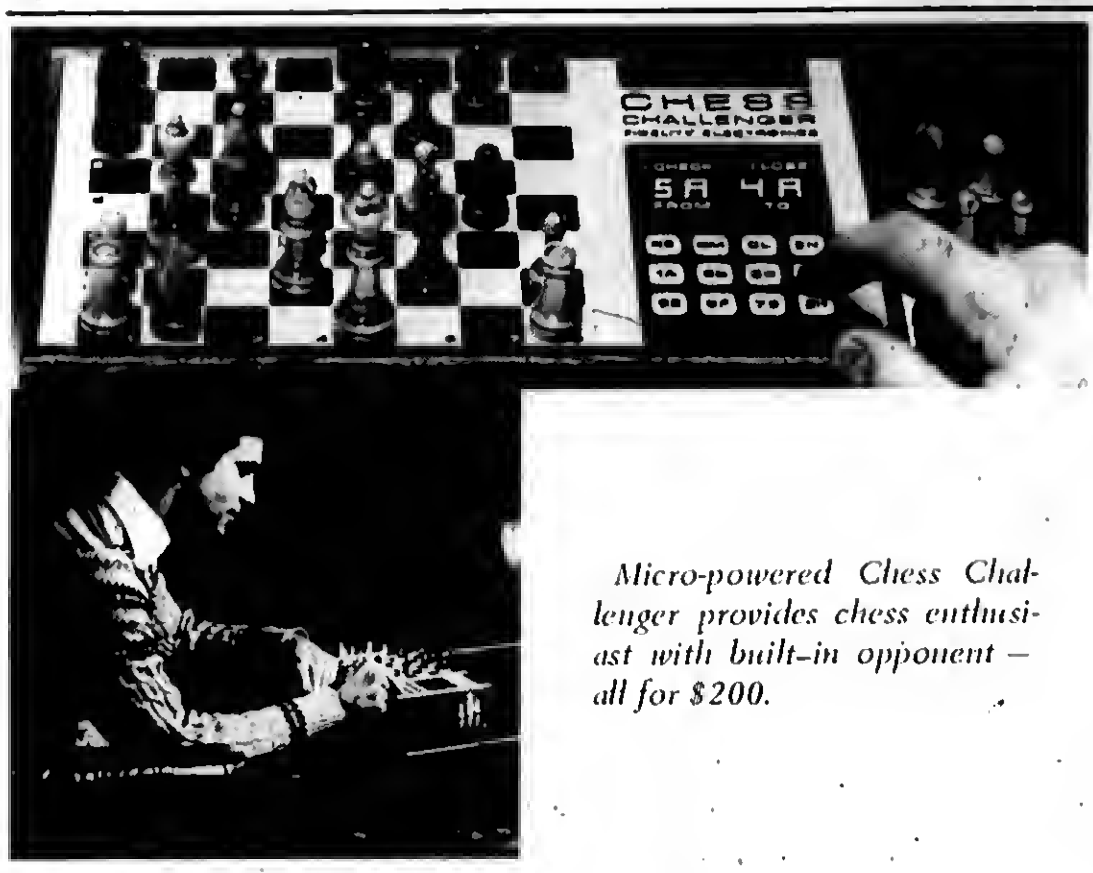

Micro-powered Chess Challenger provides chess enthusiast with built-in opponent — all for $200.

Micro-Controlled Challenger Plays 'Unnerving' Chess Game

By Molly Upton
Of the CW Staff

ROCKVILLE, Md. — Those who have the urge to play chess but who can't find a partner can eliminate their frustrations hy playing with Chess Challenger, a microcomputer-controlled game.

The player indicates his moves by inputting the position to which he is moving a piece on a 12-key control pad. There is no need to identify which piece is being moved because the Challenger retains that information from previous moves, according to Harry Krause, marketing manager for Chafitz, Inc., an electronics specialty store here.

The game then responds with its own move, usually within one second, and the new and old positions of the Chess Challenger are displayed in four light-emitting diode characters, Krause said.

The game was developed by a medical electronics engineer and incorporates an Intel Corp. 8080 microcomputer, which is programmed to play an aggressive game, Krause said.

The Challenger assigns a value to each piece and goes for board control. "If you're not very careful, you lose," Krause said.

Improves One's Game

One can also improve one's chess game through repeated encounters with the Challenger, he said. When Krause started, he lost 18 out of 20 games, but he is now splitting on a 50-50 basis, he added.

However, having one's opponent react so quickly can be "a bit unnerving," he warned.

"We've even had parents who play chess buy a Chess Challenger for their children who are just learning the different pieces and moves," a spokesman said. Once beginners learn the basic moves, they can practice games and strategy and hecome a decent player in a relatively short time.

Chafitz is the exclusive direct distributor, although the unit can be found in some department stores, Krause said.

Beginning in July, Chafitz expects to offer two other degrees of difficulty for the game by incorporating another micro, he said. First priority will be to retrofit current customers' games, he noted. The upgrade will cost ahout $75, and the Challenger costs $200.

The existing game has instructions enahling players to make the computer move first or set up special problems, Krause said.

Chafitz is at 1055 First St., Rockville, Md. 20850.

EFT Commission Gets Revealing Feedback From General Public

By Frank Vaughan
Of the CW Staff

HOUSTON — When commissions meet to ponder such weighty issues as electronic funds transfer systems (EFTS), even the hest minds can overlook the questions which are of great concern to the public.

Wayne Boucher, who has been serving on the National Commission on EFTS, related one of the unusual aspects of the commission's efforts at the 5th Annual International Conference of the EDP Auditors Association here.

As a result of an erroneous wire service news story, the public was told the commission was seeking public comments on EFTS, and 6,000 letters arrived at the commission's offices. Only 11 were in favor of EFT, 10 were "uncertain" and the rest were against it.

Rather than ignoring the letters, the commission compared their contents with its concept of what constraints should be placed on EFT systems.

The commission had been examining such aspects as controls, use, impact on fiscal and economic policies, cost henefits, the management of information and privacy, recordkeeping and telecommunications.

Religious Implications

The concerns of the puhlic matched the areas the commission was examining with one exception: religious implications. A good numher of the letters received quoted the Bible's Book of Revelation and voiced a concern that the move to electronic funds was one step further in man's race to the "last days."

People feared they would soon have their Social Security numbers printed on their foreheads by laser beam without their knowledge," he explained.

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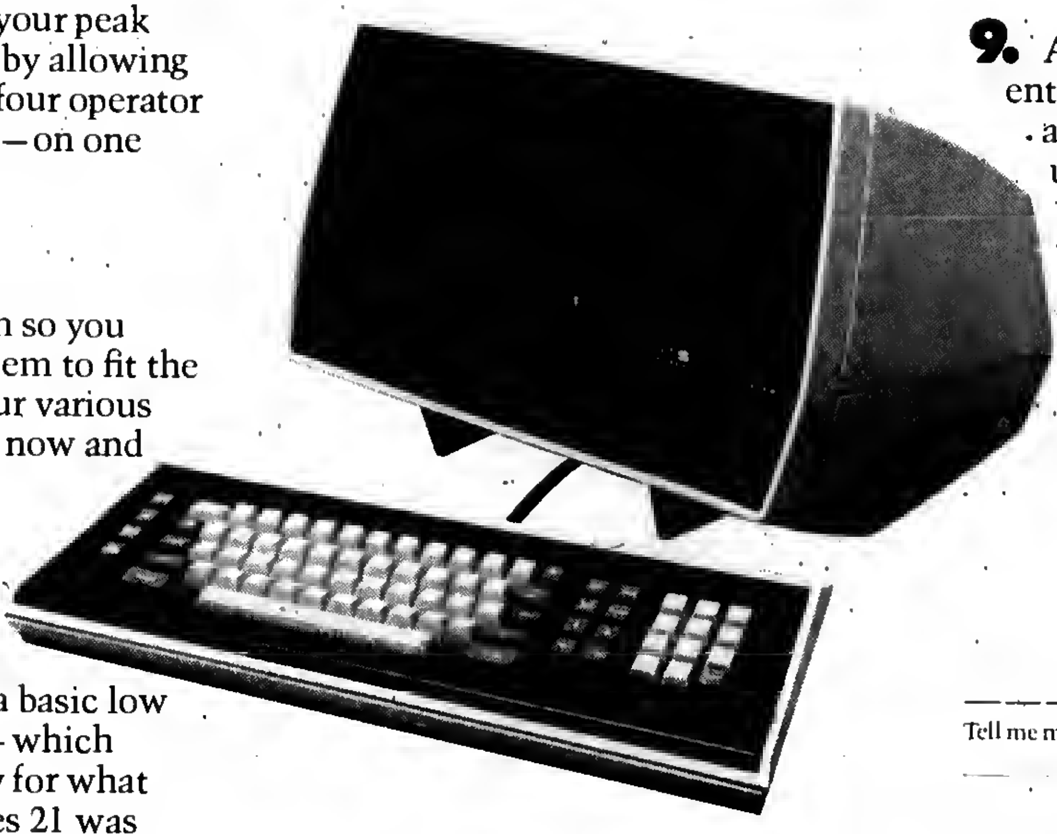

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Technicians Prepared for Tomorrow

DP Operator Training Seen Aimed at Today's Tasks

By Ann Dooley
Of the CW Staff

DALLAS — The training provided for computer operators in a production-oriented DP center has different goals from that aimed at a more technical and highly educated staff, two DP training experts at a recent conference here agreed.

Because of time and money priorities, operators are trained to function at their assigned tasks, while a more technical staff is often trained for career growth and knowledge enhancement, they said.

Jack Stone, owner of Computer Education International, Inc., described to attendees his method for improving performance and employee activity in medium- and large-scale computer centers.

Training is an art form, Stone said, but trainers must get more responsibility in order to be more effective at their jobs.

Sometimes various kinds of employees are included in the training sessions — secretaries as well as DP personnel — and everyone wants help with their particular problems. And when the training period lasts only a few days, it's impossible to solve all the problems, he said.

One way of alleviating the difficulties is to find out what the key problems are before the training begins, Stone noted.

A training proposal should be circulated to the client so employees will start talking and thinking about the program. The proposal should he sent all the way down the line so the operators, who will be most directly affected, will have a chance to contribute their ideas, he said.

Such an effort is worthwhile since the students appreciate being included in designing their own development program, Stone added.

For the most part, the attitude of the operators and other DP pesonnel is very negative. "There's a lot of hostility," he said, because they feel undervalued and ignored."

Problem of Resentment

When a problem with the computer occurs, the operators don't know what to do, so the system analyst comes in and takes over and the operator resents it.

While there is a growing awareness of the need for training, it is often done in a "slapdash way." The usual excuse is that a company's employees are too busy to take time out for training.

But what kind of product are they developing? Stone asked.

Cost-effective training should teach only the skills that the operator uses today's DP environment, according to Stone. "That's all you can expect — better skills today," he said.

Providing training time away from the current job is crucial to learning, he said. People must have time to think and reflect on what they've heard or they won't remember it, he stated.

The program should offer only a limited objective as to how much the trainees should learn, he said. They don't need to know more than the elementary concepts of the system. But right now, they don't know anything about what's going on and "yet we entrust them with a thousand-dollar environment," he added.

A basic problem with which operators must deal is that they have no identity — they have no desks of their own or individual working areas. They want to become programmers because they feel they will be identified then, Stone said. The problem is that many of them don't have the communication skills or business backgrounds to be programmers, he said.

Honeywell Program

In contrast to Stone's training program, Lawrence Lunetta, manager of the Advanced Engineering Program at Honeywell Information Systems described how Honeywell's program attracts and places "knowledge workers." It must be determined who the knowledge worker is, what he's doing and where he works best, and that can't be found out in a typical training program, he said.

The Advanced Engineering Program helps the knowledge worker determine alternatives by rotating his work assignments, Lunetta explained. Each student is provided with a wide variety of experience in hardware and software over the three-year program, he said.

Each program member receives a graduate or doctoral degree from Arizona State University, time off from work and most expenses paid, Lunetta said.

In addition, internal training is offered including lectures, seminars and hands-on training, most of which is customized to Honeywell equipment, he said.

Students Recruited

Although program members were originally recruited from within the company, today most students are recruited from universities. It was discovered that employees with well-established lifestyles found it difficult to devote the 60 to 80 hours a week the program sometimes demanded, according to Lunetta.

Recruiters look primarily for someone with a B.S. in electrical engineering or computer science who is in the top 5% of his class, he said. Applicants must be highly motivated and regard the program as a reward because they consider themselves "more special than others," Lunetta said.

Currently, there are 26 students in the program, with a yearly turnover rate of 10 to 15 people in the form of incoming and graduating students, he added.

The program offers education plus experience, special opportunities, a company commitment to develop each member's skills, varied work assignments, internal training and "being exposed to the leading edge of technology," Lunetta said.

The company benefits by bringing in top talent from around the country, he added, and the retention rate has been over 80%.

The program creates a balanced system providing the student with career flexibility while the company gets critical work accomplished. The student has special opportunities and the company is provided with future leaders.

While Stone admired such a program, he said it was unrealistic to attempt in a production-oriented environment.

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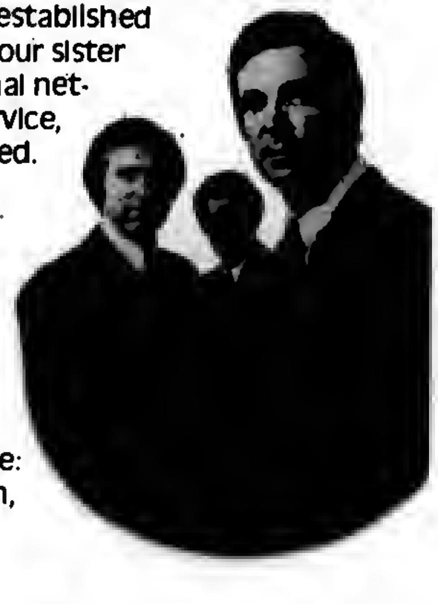

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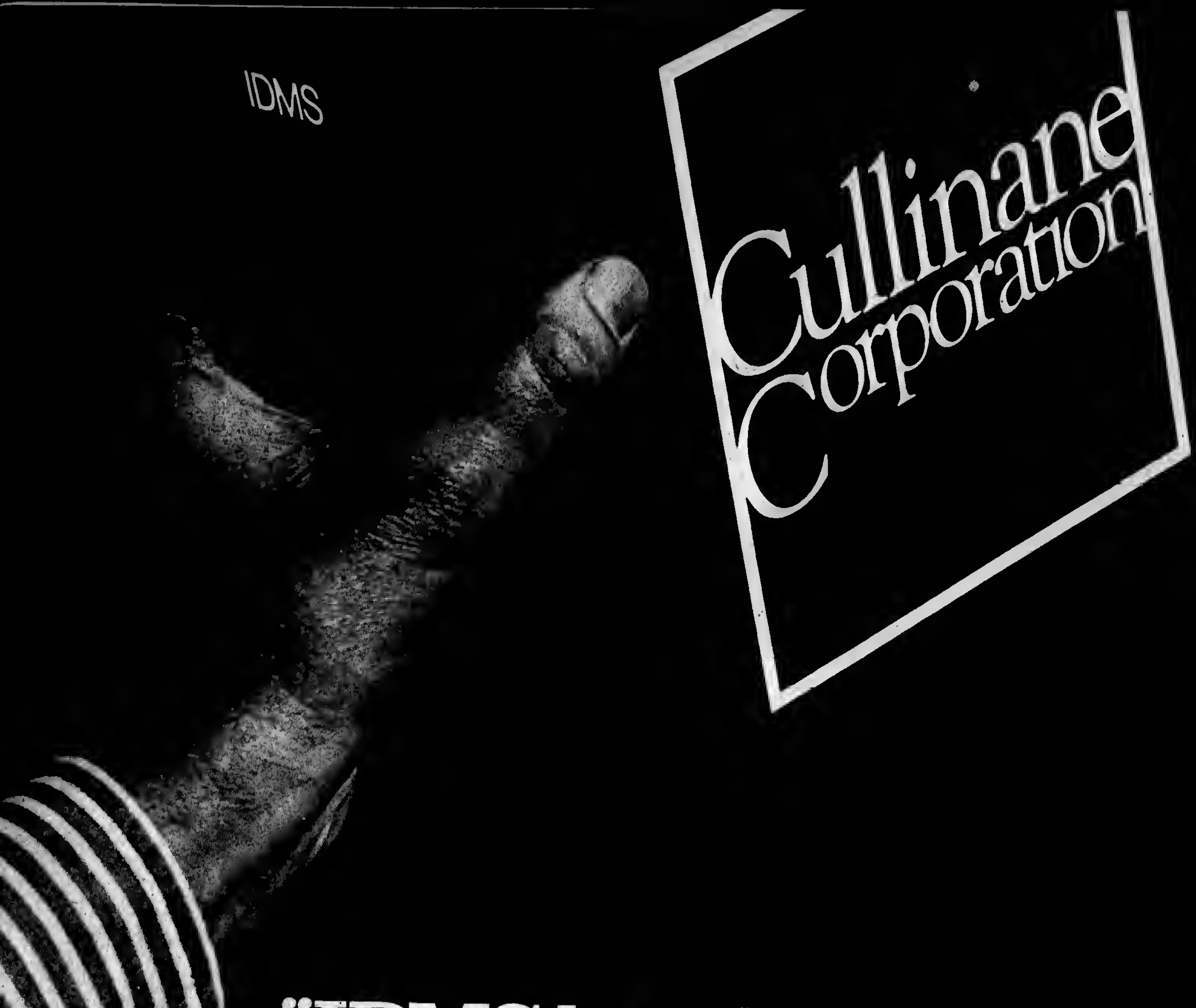

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Pushbutton System Gives Teacher Students' Feedback

By Ann Dooley
Of the CW Staff

CLEVELAND — Students at Case Western Reserve University here can tell at least one of their professors what they think of his teaching under an experimental program designed to improve communication.

The Olin Experimental Classroom study utilizes student-activated electronic push-button boxes, TV cameras and a Texas Instruments TI 960 process control computer, according to associate professor James L. Rodgers.

While student response systems have been used in this country and the Soviet Union for some time, these previous systems would allow the students to respond only at the teacher's initiative and only on a multiple-choice format, Rodgers said.

Using the experimental classroom and a 12-button key set, each student can respond within the format provided by the teacher. Although the student is limited to 12 responses in declaring his actual feelings, he can indicate such feelings as confusion over a lecture point, the wish to speed things up, the fact that he's bored with the material, or anything else that has been programmed, according to Rodgers.

The system isn't limited to any one set of responses, either, he said, since an instructor can change the labeling on the response buttons at any time. The computer, which displays and prints the responses, can also handle data in different forms.

Students Take Initiative

"The most distinctive feature of the Olin classroom is that students can respond at any time on their own initiative. A student who does not understand a point can indicate his confusion as soon as he realizes he is missing something," Rodgers pointed out.

The instructor has the ability to either monitor student response on the TI desk-top terminal during class or review the class on videotape with the tabulated responses superimposed on the image, he said.

Prof. Krishna Kumar used the Olin classroom for his statistical methods class during part of the spring semester in order to encourage more participation.

"A student may hesitate to slow down the instructor in a traditional classroom because he fears his peers or the instructor may think he is 'dumb.' If the students feel the response is anonymous, they will ask for clarification when they need it," Kumar said.

While the class is in session, the instructor is unaware of who is pushing a button, but the videotape indicates which button on which desk was pushed.

Kumar is currently tabulating results that will indicate whether the system has increased participation by his students.

He compared last year's responses with this year's by counting how many times each student pushed a button and the number of times each of the 12 buttons was pushed. The most commonly used button was "repeat," he said.

Most students liked the experimental classroom because they felt it made the professor more responsive to their needs.

The teacher response has been mixed. Those who might need it most could also be the ones least willing to try it, Rodgers noted.

Another problem is that an interested professor must get his own funding for the classroom since the university does not provide any money toward the operation of the experiment, Rodgers said. So far, only Kumar's class has used the classroom.

Since the project doesn't have any operating money, student programmers were originally used, but the results proved to be very inconsistent, Rodgers said. The project was able to hire a part-time programmer and everything has gone more smoothly since then, he said.

The Cleveland Board of Education recently used the classroom as part of a federally funded project to improve the quality of classroom observation and evaluation. Administrators watched videotapes of several classes and used the response buttons to evaluate the teachers. With a printout of the evaluations, their supervisor was then able to discover areas of agreement or inconsistencies within the group.

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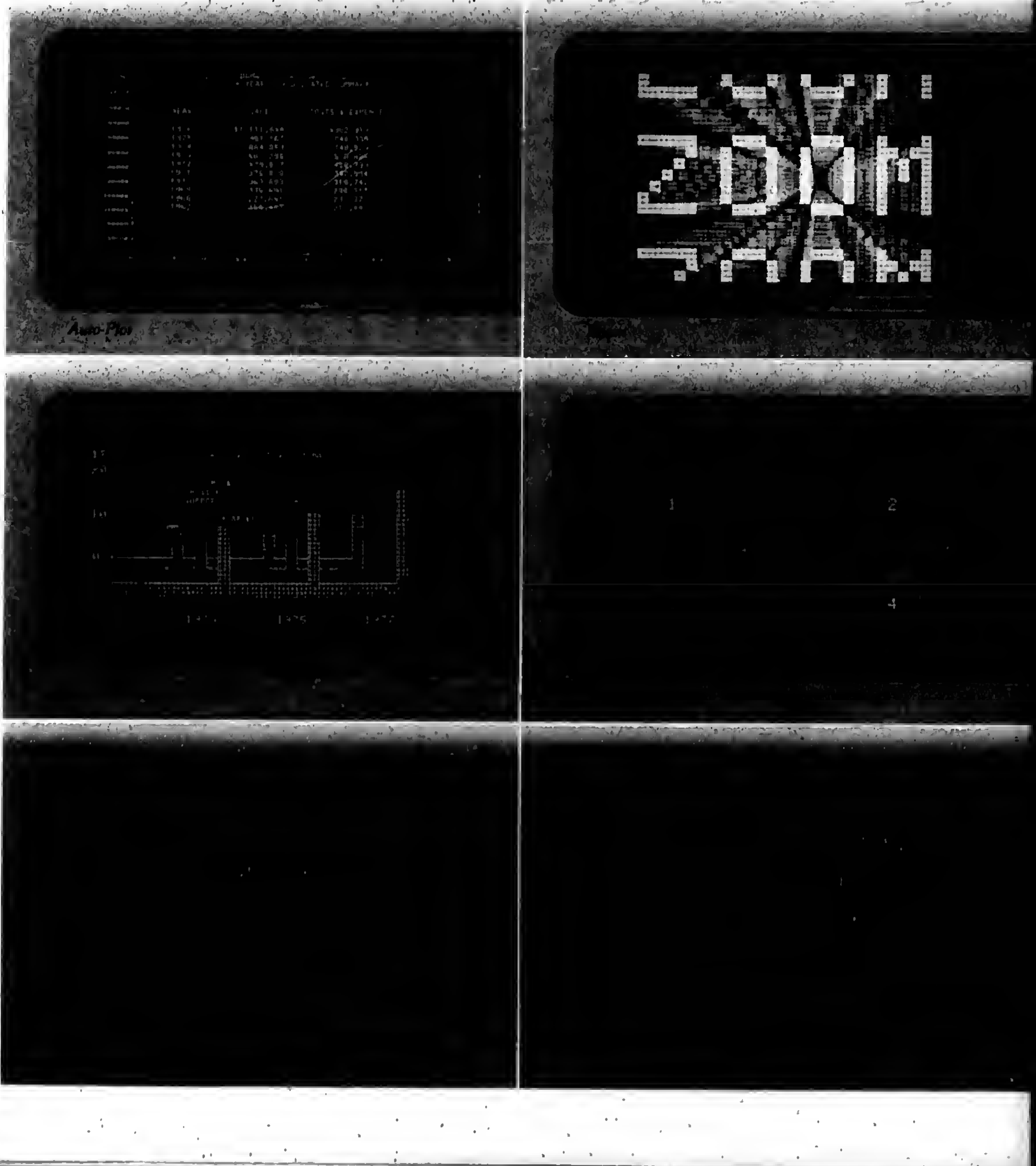

ICCP Honors Top CDP Exam Scorers

CHICAGO — Two DPers who received top scores on the 1977 Certificate in Data Processing (CDP) examination will receive cash awards and CDP keys and certificates.

Paul Rosenthal of Gottfreid Consultants, Los Angeles and Samuel T. Redwine of Applied Management Sciences, Inc. of Silver Spring, Md., will receive $250 each from the Institute for Certification of Computer Professionals.

Four individuals shared the top score in programming. They are: Robert L. Schwenk, employed by Pacific Mutual Insurance Co. of Newport Beach, Calif., William LaPlant Jr., who works for the United States Air Force in Washington, D.C.; Manley Reynolds of Mountain Bell in Denver, Colo.; and Moshe Rabinowitz, who works with Metropolitan Life Insurance Co. in New York.

Fred L. Potter, who is employed by Sulloway, Hollis, Godfrey and Soden in Concord, N.H., received top honors in the management portion of the examination, the ICCP said.

Top scorer Rosenthal received the highest grade in quantitative methods and Howard Glen Weekley, who is employed hy the Texas Air Control Board in Austin was the nation's top scorer in systems analysis.

All receive CDP keys and certificates reflecting the award of Excellence and will be honored in their local organizations by ICCP representatives.

ACM Plans Job Register For Computer Specialists

DETROIT — An employment register for matching computer scientists and DP specialists with employment opportunities will be conducted again at the Association for Computing Machinery's Sixth Annual Computer Science Conference here Feb. 21-23.

Previous registers have attracted thousands of applicants who are both experienced professionals and new graduates as well as employers in business, industry, government and academic institutions, according to Orrin E. Taulbee, director of the register.

Anonymous applications are accepted, he added.

How It Works

The register works as follows: Each applicant completes a form giving identifying information, education, publications, experience, interests, references, position and salary desired.

The employer completes a similar form giving identifying information, position available, starting date, salary and benefits as well as education, experience and specialization required for the position advertised.

Three different forms are required, so when requesting forms, people are urged to identify themselves as applicants or employers in academic institutions, business, industry or government, Taulbee indicated.

A separate form is required for each type of position available, but only one form is needed in the case of several identical positions.

Must Be Typed

Completed forms must be typewritten since they will be reproduced exactly as submitted, and no photocopies will be accepted, he said.

Filing fees are as follows: applicants $5 plus $5 extra for an anonymous listing (students are free); and $20 for employers for each job form submitted.

A check for the appropriate amount, payable to the Computer Science Employment Register, must accompany the forms.

Requests for forms should he addressed to Taulbee at the Department of Computer Science, University of Pittshurgh, Pittsburgh, Pa. 15260.

NCC Board Elects Chairman

SUNNYVALE, Calif.— Ralph R. Wheeler of Palo Alto, manager of computer time-sharing services at Lockheed Missiles and Space Co. here, has been elected board chairman of the National Computer Conference.

This policy-making body is responsible for arranging and conducting the annual meeting sponsored by the American Federation of Information Processsing Societies.

Wheeler will serve a one-year term beginning July 1. He moves into the chairmanship after serving on the NCC's board of directors as the representative from the Society for Computer Simulation.

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Raster Scan. No more pulling down the blind to make your plots visible. Our display is clear and easy to read even in bright light. And the raster scan technology permits selective erase, cutting down the time it takes to modify your picture also.

Zoom and Pan. This lets you magnify any area of the display up to 16 times. And you can pan in any direction for closeup investigation of complex designs, without having to reinitialize the data.

Area Shading and Pattern Definition. This makes it easy to distinguish areas with similar shapes, such as bar charts, mechanical parts and architectural drawings.

Rubber-band Line. You can draw trial sketches, such as architectural floor plans, with or without CPU connection. Think of the time and money you'll save by cutting down mistakes.

Independent Display Memories. Both alphanumeric and graphic data can be shown independently or at the same time. And you can carry on a dialogue with the CPU without disturbing the picture.

The HP 2648A also has all the advantages of our popular HP 2645A alphanumeric terminal. Specifically: mass-storage on 110K byte cartridges (you can store graphics as well as data); 'soft keys' to speed up repetitive jobs; one-button self-test; plug-in PC boards for easy maintenance; extensive data communication and off-line capabilities.

This bright new look in graphic terminals is designed for such applications as electrical, mechanical and architectural design. For process and control. For scientific plots. And for business planning.

We'd like to give you a graphic demonstration of everything the HP 2648A can do. Send us the coupon and we'll set it up. Or contact the nearest Hewlett-Packard sales office listed in the White Pages. We're sure you'll get the picture.

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Editorials

Record Keeping Under Scrutiny

The reprieve is over. With the final report of the Privacy Protection Study Commission last week (see story on Page 1), the record keeping practices of the private sector are now going to be coming under ever greater scrutiny.

The report does not call for blanket federal regulation of private-sector record keeping, but rather points to 14 areas where there is a need for new legislation to help safeguard personal privacy.

However, all people involved in private-sector record keeping — particularly users of computerized systems — should be aware of the report's recommendations and its proposals for legislative action.

The new regulations could affect almost every DP shop in existence in one way or the other over the next few years.

All DP managers should become informed about the potential effects on their operations and should be willing to inform their congressmen about parts of the legislation they feel will either be too restrictive or not restrictive enough.

Only with constructive participation from those familiar with DP will Congress be able to sort out the myriad issues raised by the commission's work. The commission did an excellent job, but its recommendations will now be reviewed by Congress and possibly changed.

Your participation in the process is needed.

It's Time for Ifip

The 1977 Congress of the International Federation for Information Processing (Ifip) in Toronto next month (Aug. 8-12) promises a wide-ranging technical program that should be of interest to many people in the computer community.

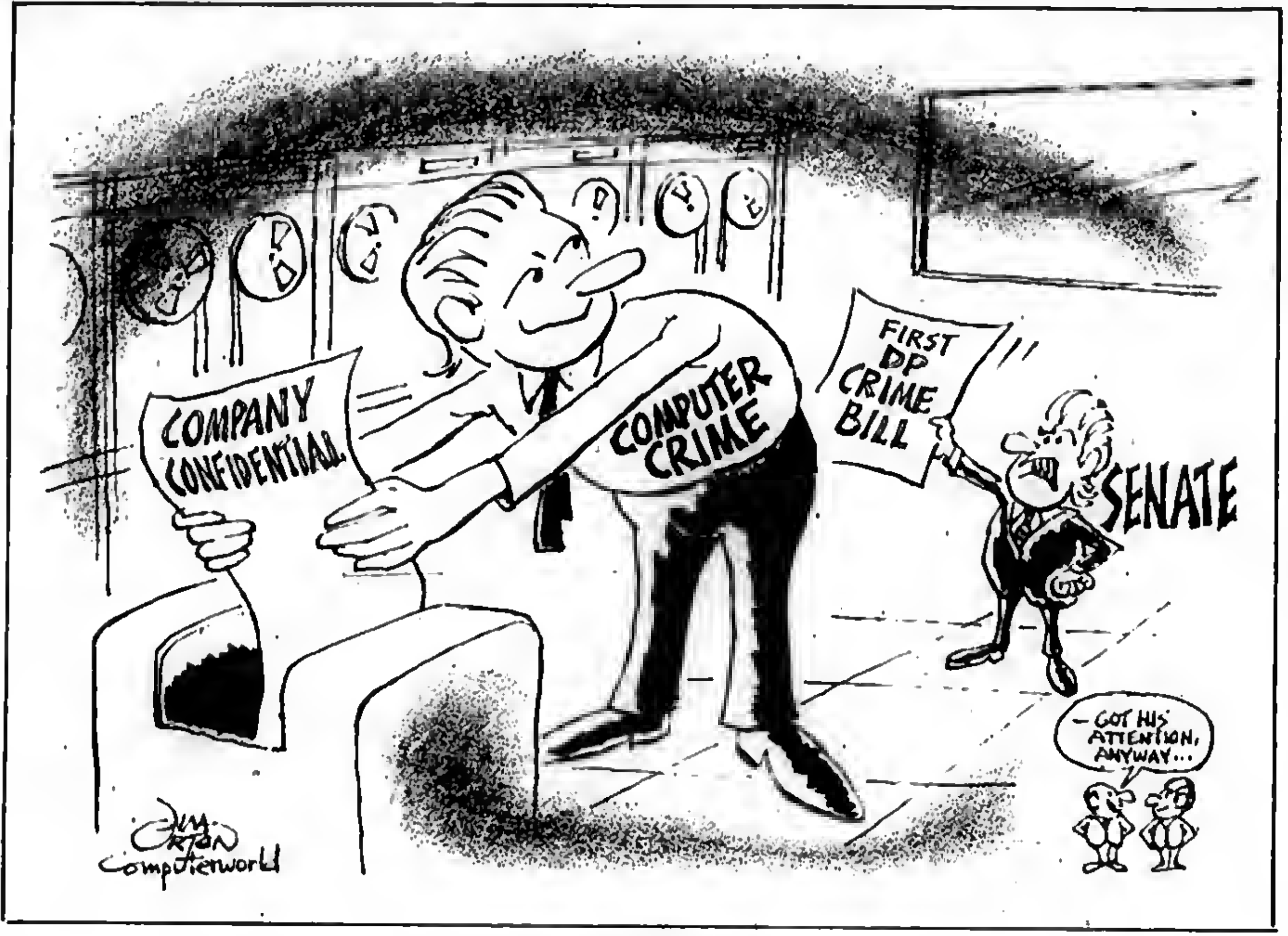
But conferences such as Ifip can only really be successful if they draw a large number of well-informed participants — not only on the dais but also in the audience.

So this is a reminder that there is still time to sign up for the conference program, even though it does carry a rather stiff $145 price tag. Out of the 108 sessions and 30 "mini" symposia there is something for everyone.

What is needed is participation by users, vendors and the assorted other folk that make up the U.S. computer scene.

You can get complete information from the Organizing Committee for Ifip Congress 77, c/o Canadian Information Processing Society, Suite 214, 212 King St. W. Toronto, Ont., Canada M5H 1K5.

These triennial congresses only rarely visit North America (the last was in 1965) so this may be your last chance for years to take part in this most international of all computer conferences.



'Stop, Thief, I Say! . . . '

Letters to the Editor

Reports of Successful NCC Elicit Response: 'For Whom?'

As I read your editorial extolling how smooth and well-run the recent National Computer Conference in Dallas was, it reminded me that it was the most frustrating experience I have ever had in attending a computer convention during my 20-odd years in the field.

You must have received different treatment from that given the average attendee. I heard many complaints, especially about the parking and lack of space at the various technical sessions.

Personally, because of a lack of space, I was able to get into only one of the six sessions on microcomputers I wanted the attend. The Afips (American Federation of Information Processing Societies) people I talked to were not even sympathetic about the situation. Their best answer was: "Yes, isn't the convention a big success?"

My question is: "For whom?"

In addition, the Dallas Convention Center was designed without any consideration for getting a wheelchair from one level to another. Furthermore, none of the guards or information center people could help us or showed any concern.

It was only through the help of some of the center's maintenance personnel and one of the college women passing out literature that we found the freight elevators that allowed us to go from one level to another.

Thanks for your good coverage of the convention, as I have been able to read about several of the sessions I was unable to attend because of the space problem.

W. Thad Lee

League City, Texas

System/80 Features Here Now

I don't claim to be an expert on the subject, but if I'm not mistaken, many if not most of the "advanced" features Lecht foresees for the IBM System/80 ["The Waves of Change," CW, July 4] have been in use for some time on such Burroughs systems as the B1700 and B6700.

This makes it all the more frustrating that Burroughs hardware reliability and maintenance are so notoriously inadequate.

Donald S. Schmick

Atlanta, Ga.

ACM Ombudsman Explains Goals

In his column [CW, July 4], Alan Taylor attempts to tell the world what the ACM (Association for Computing Machinery) Ombudsman Program "apparently intends to do." What amazes me is that at no time did he ask me.

The ACM Ombudsman Program exists to resolve difficulties that may arise when people interface with computers. Specifically, our goals are to:

1) Educate the public concerning the computer's real capabilities.

2) Identify and help resolve any generic cause of computer-related problems.

3) Act as a third-party fact-finder.

4) Strive to improve interfaces between individuals and computers.

5) Respond to instances of "blaming the computer."

The program is much more extensive than Taylor imagines. In fact, it has been very successful in:

1) Analyzing computerized election systems in Detroit and Los Angeles.

2) Reporting on EDP schools in Nebraska, New Jersey and southern California.

3) Publishing a report entitled "Privacy, Security and the Information Processing Industry."

4) Studying the Bay Area Rapid Transit System in San Francisco.

In short, the advancing knowledge of computers is becoming understood both inside and outside the ACM.

Dahl Gerberick
Chairman, Ombudsman Committee
Association for Computing Machinery
New York, N.Y.

Data Past

Five Years Ago
July 19, 1972

PHOENIX — A federal judge ruled here that there was not enough evidence to send the 33-month-old Greyhound Computer Corp. vs. IBM case to the jury.

Two days after IBM was granted the directed verdict, Greyhound filed a notice that it would appeal the case.

— — —

Eight Years Ago
July 23, 1969

NEW YORK — A service that converted 1401 Autocoder or 7074 Cobol into 360/DOS Assembly language or OS Cobol was introduced. Peter D. Colgan, president of CPU Management Advisory Corp., said "the Total-Tran package can convert, or at least flag on the listing, 100% of the statements in any Autocoder program." Maximum cost was 60 cents per statement.

— — —

LOS ANGELES — An investigation into the possibility that fraud could be committed with computerized voting was ordered by the Los Angeles County Board of Supervisors. Critics charged it was possible to rig elections with the system being used, an IBM Votomatic.

'People's Computer Center'

DP Education Program Reaches Inner-City Residents

By **Jack Stone**
Special to Computerworld

It is commonplace these days to read of the marvelous achievements of computer technology in industry, science, commerce and government. And it is normal for one to relate these successes to one's own professional and personal situation. As the members of the DP industry are reasonably well-off economically, socially and culturally, advances in computing are directly coupled with our personal growth and development aspirations.

But there is another segment of our society which has an entirely different viewpoint toward computers. I refer to the citizens of the inner-city segments of American urban communities.

Because of a long history of economic and social deprivation, most of these people view the computing industry as a source of fame, fortune and riches for higher ranking social clases and perceive advances in the technology only as serving to widen the gap between rich and poor. For those few who have made a successful transition from poverty to a decently paying DP job, success came only after intensive competition with better educated people.

In summary, it is difficult to identify those areas where computer technology has been of particular benefit to the poor, except possibly for the prompt and accurate distribution of welfare checks.

Recently, I learned of a movement toward the establishment of a "people's computer center" located in the heart of the inner city, whose goal is to apply computer technology to the solution of some of the social problems in these communities.

In the District of Columbia, Afro-American Datanamics, Inc. provides such a capability. Milton White, board chairman, and Teixeira Nash, executive director, consented to an interview with me.

Q: Can you summarize the major aims of Datanamics?

White: Our motto succinctly characterizes the nature of our work: "technology for community effectiveness." Specifically, we are a nonprofit organization whose purpose is to provide computer technology for the use and benefit of the black community. However, while using the computer in community development, we are also striving to prevent the social abuses and dehumanization that tend to accompany modern technology.

Q: What is the nature of your organization?

Nash: We are a group of social scientists, social artists and social technologists. We view ourselves as a mixture of community people working within the unique and unifying socio-cultural framework provided by Datanamics. We hope that by bringing these three diverse disciplines together at the same computer consoles we will develop greater strength in solving the problems of the black society in America today.

White: You see, the arts of our community have for too long been at odds with the science of our community, even though these were often two approaches to the same goal — making it. The black community gambler and hustler are not far in a technological sense from the mathematician and the Wall Street broker. Datanamics must identify the strengths of these native technologists and apply these strengths for their utilization to community development as well as individual growth.

Q: Dr. White, what is your background and how did you get involved with Datanamics?

White: I am a part of black American society. I strengthened my knowledge of this society when I received my doctorate in political science from the University of California. I have had considerable academic experience at the university level, in both teaching and administrative positions, and am currently an associate professor of political science at Howard University. I helped organize Datanamics three years ago when it became clear to me that the university establishment was not doing enough for deprived people in urban areas.

Q: What are the major services that you render?

Nash: Our primary service is that of computer-based education and training.

The Human Connection

Toward this end, we have installed a Digital Equipment Corp. PDP-11/45 with 96K words of main storage, which is configured with 10 DEC terminals, six teleprinters and four video. The machine system was provided as the result of a grant from DEC, to whom we are deeply grateful.

Through the use of these teaching terminals, we offer courses to advance the basic skills of math and reading, plus courses in DP. The DP courses include machine operations, programming and data entry, and the terminal training sessions are, of course, supplemented by "hands-on" experience. We have programming courses in Cobol, Fortran and Basic.

With our computer capability, we are able to help support and rehabilitate organizations in our community, such as neighborhood employment services; religious groups and economic development projects.

Q: Can you describe your educational software, as it were?

White: We have two general types of terminal-oriented educational programs. We call the first one "computerized learning," in which all instructional material is presented at the terminal. The student works at the terminal on an individualized basis, moving at his own pace.

The second is called "computer-assisted" or "computer-managed" instruction, in which the terminal serves only as a tutor — a "homework coach," if you will. The material in this case is of the drill and practice variety and requires that an experienced instructor be present.

Q: Where do you obtain your educational software?

Nash: Well, we tried very hard to use commercially available packages. However, they don't work well in our environment because our students have difficulty understanding their questions. So we develop our own, using teams of instructors and neighborhood citizens which we call "cultural language committees." We use high school dropouts in the course authoring process to help compensate for the language gap of our staff caused by social and age factors.

I should note that we have had about 200 citizens pass through our terminal training and have more than 1,000 waiting in line. All training is provided at no cost to the student.

Q: And what does the future hold for you?

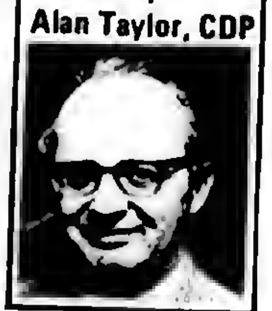
White: I visualize growth in three areas, depending on availability of external funding: extension of instruction into the home to accommodate the inner-city stay-ins, via combined TV and computer technology; computerized community support of health clinics, cultural events and tips on nutrition and energy; and the expansion of our concept into other major cities to create a network of community computer centers to serve more of the economically and socially deprived people of this country.

Additional information may be obtained by writing to Datanamics at 3201 14th St. NW, Washington, D.C. 20010.

Advent of 'Vax'

Large Minis Could Signal End to Huge Price Markups

The Taylor Report
By
Alan Taylor, CDP



The relationship between the manufacturing costs of computers and their selling prices has traditionally been one of very high markups, at least with the traditional "carriage trade" firms. A markup of 500% over cost has not been considered unusual, and 600% or more is not unique, by any means.

Moreover, these prices have been charged for equipment that recovered all its research costs years ago, so the standard excuse that manufacturing costs are only a small part of actual costs really did not hold water. Technology appeared to insulate prices and keep them high.

But now, a new, officially unannounced computer from the minicomputer market seems destined to break the immunity from market economics that has kept maxicomputer prices at such high levels. Called Vax, and scheduled for announcement in October by Digital Equipment Corp., this 32-bit system is priced according to the economics of the mini industry — which has never been able to establish the complete financial control over its products to which maxi marketeers have been accustomed.

Even the initial price for this computer and its successors has to be established recognizing the strength of competition from the mini market and its ability to produce effective hardware at lower prices. So the markups will not be extremely high to start with, and they will come down as time goes on.

Really, what is happening is the beginning of the merger between minis and maxicomputers — with considerable benefits for the current customers of both types of systems.

Through emulation and through language facilities, the minicomputer user will get both the additional power that is often needed and the ability to use his current programs, to match in with traditional 16-bit minis.

The maxicomputer user will get the ability to use a system much like the ones he has grown up with, but at reduced, competitive hardware costs not offered by the traditional maxicomputer market.

Powerful peripheral and communication flexibility in particular will be economically available. In addition, this flexibility can be expected to be enhanced by the ingenuity of the many smaller specialized manufacturers who have already gained considerable understanding of DEC's bus architecture and how to use it to its best advantage.

Maxi Future

What this development will do to the maxi market is anyone's guess. The key point appears to be that the end to users' automatic growth demands seems to be here, and with it the end to automatic renting of larger and larger systems.

Most high-volume applications are already up and running. Despite great progress in theoretical understanding of optimization and transportation algorithms, invoicing and payroll-type applications as opposed to weather-forecasting are what the maxi user sees his computers handling in the next few years.

The maxi user's confidence in his own DP staff's abilities has also grown. The necessity for constant reeducation has dropped off from its Sixties peak, when it seemed that no sooner was an application working than something had made it obsolete.

At that time the carriage-trade maxi manufacturers were really providing their users with something essential in return for the high markups they charged — but that time has long gone.

> *'Really, what is happening is the beginning of the merger between minis and maxicomputers — with considerable benefits for the current customers of both types of systems.'*

Yet, inertia among computer users is high. The maxi manufacturers will certainly be around for a long time to come, although one or two may succumb. There will still be various announcements and plenty of marketing department fireworks.

Software suppliers, who are doing a booming trade and producing some excellent products these days, will still concentrate upon supplying the needs of the maxi market first, as a proving ground for their products.

Progress will be slow on the surface. After all, it is nearly a decade since DEC announced the Decsystem 10 as an entry into the maxi market by a mini manufacturer. But that was always a maxi machine, sold a little bit differently from other manufacturers' large systems.

It was not, and could not be, what the Vax family is going to be. Vax will gradually put to rest the concept that minicomputers are one area where the user can get hardware value, while maxicomputers are another area where the user can't get hardware value, but does get other compensations. In just another decade that concept will be gone.

Vax comes from, and will live in the era when additional logic is cheap and when language packages, operating systems, flexible input/output and applications are much more readily available than was ever anticipated.

Vax will have its successors and competitors which, among them, will provide service as good as that any maxi manufacturer can offer to the average user.

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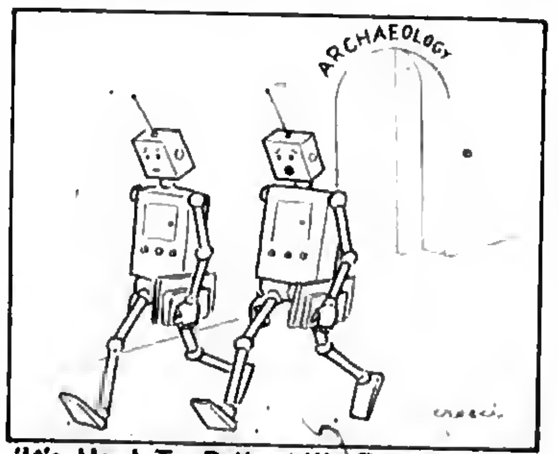


'It's Hard To Believe We Evolved From Primitive Vacuum Tubes.'

Reader 'Horrified' by Stone

Is Supplying DP Training to Iranian Police Ethical?

Reader Commentary

Dear Mr. Stone:

I read with absolute horror your column of June 20. With all the recent talk of ethics in the computer field, to write an article about training Iranian policemen in computer technology without any consideration of how this technology might be used seems incredible to me.

Are you not aware of the horrors perpetrated by the Iranian police? The tales of torture, suppression of dissent and other acts of official terrorism are almost endless and well documented. Do you not have any qualms about facilitating this brutality?

It seems to me that if our profession is ever to confront the problem of ethics, it should start with the most blatant of abuses — and it appears that this training program could very well constitute such an abuse.

Since I do not know precisely what this training was for and how exactly it will be used, I cannot say for certain that this was a breach of what I would consider professional ethics. However, the possibility exists and I would not have participated in such a program until and unless I was fully satisfied the end result would be benign.

Perhaps the thought that Iranian policement are attaching electrodes to the genitals of an uncooperative peasant who was located by use of a computer system your students helped design does not bother you. Personally, I could not live with that on my conscience.

Let me say that I enjoy your articles and appreciate your usual sensitivity to human issues in computing. This article, however, was such a depature from your norm that I felt compelled to call your attention to it.

I would be pleased if you could devote further articles to the ethics of supplying technology to persons who might misuse it. It is certainly an important but often ignored subject.

Saul I. Tannenbaum

— — —

Dear Mr. Tannenbaum:

The seriousness of your accusations and the ethical issues you raised have led me to ask *Computerworld* to put both your letter and my response in print.

The project you question was originated in March 1975 by the Iranian Police Department as part of a long-range training program to upgrade its computer center personnel, broadening their skills from those relating to a second-generation batch processing operation to those relevant to a fourth-generation distributed processing environment.

The Iranian Police Department had hopes of using U.S. systems development firms to construct and implement national police systems. In anticipating of this, it wanted selected members of its staff to gain a working knowledge of American computing and police management systems.

I believe the Iranian government approached Languge House of Chicago and the Public Management Systems (PMS) division of Planning Research Corp. (PRC) of McLean, Va., to handle the English language upgrade and technology segments of the programs, respectively.

I have been an entrepeneur for 10 years and owner/managing director of my own education consultancy firm for nearly five years. I believe I conduct my business at the highest level of ethical standards present in the computing industry.

Further, though the industry has been very good to me, I feel I have given much to it through the courses I have taught, lectures at public forums, papers at professional societies and my column in *Computerworld*.

With that in mind, it should be easy to see why I took this assignment. First, I was asked to do it by PMS, which sought me after receiving a recommendation from a sister division for whom my colleagues and I had worked over an 18-month period. PMS/PRC is a big company, listed on the New York Stock Exchange; it could have gone anywhere in the world to obtain a training subcontractor, but it came to me.

I had a very strong business obligation because PRC is a major customer of mine and it needed my help in solving a very, very difficult training problem.

Second, all of the training performed by my organization is aimed at building the skills, attitude and motivation of DP managers and technical personnel to do a better job. We do not design or construct systems for customers.

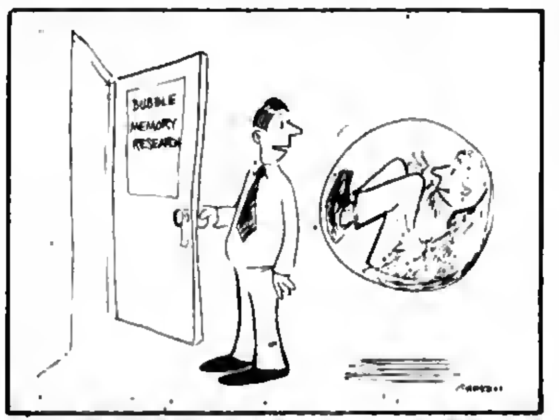
As a citizen of the U.S. I strongly deplore the suppression of human rights anywhere in the world, including our own country, and I completely endorse President Carter's policy in this regard. But how do I deal with the allegations or even documentation of such violations of basic human rights in other countries?

Do I become a committee of one and reject my students and turn aside my customer and, in another dimension, discard the policy of friendship with the Iranian government, which is the established policy of the U.S.?

No, I don't believe my actions were a violation of professional ethics. Instead, I would have felt I had violated the trust my customer placed in me and would have ignored the established foreign policy of our country were I to have rejected the project.

Jack Stone

Tannenbaum is a programmer in Boston, Mass. Stone is president of Computer Education International in Washington, D.C., and a regular contributor to CW.



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Reading Mail Pays Off

Package Leads to Simpler Coding of CICS Programs

By Don Leavitt
Of the CW Staff

SAN FRANCISCO — Every once in a while, the flow of sales literature that passes over a DP manager's desk leads to something really worthwhile. That at least is the experience of a manager for an air freight forwarding firm based here.

Novo Air Freight has both domestic and international operations. The data center here, based on a 256K IBM 370/135 and a 512K 370/145 under DOS/VS, handles all accounting and shipment information for the corporation, according to Al Patrizio, director of management information systems.

The 145 supports all the teleprocessing for the firm including 40 local terminals and 110 more "spread from Alaska to Florida to New York to California," Patrizio said. The network is used for inquiry and data entry applications for a CICS/VS-driven data base residing on multiple spindles of 3340 and other disk space.

The programming staff, split into teleprocessing and batch groups, amounts to seven people with another slated to come aboard shortly. It is, in Patrizio's view, a limited but extremely talented staff.

Not long ago, Patrizio received a brochure describing a package from Oxford Software Corp. The full name of the package is User Files Online, but Oxford stressed the shorter name UFO in its brochure, and Patrizio admitted he was intrigued by the name and the artwork.

Beyond that, he "had to read it because of the application we were addressing at the time," an international shipment system. Classified as a display management system for CICS, UFO seemed to offer a way to avoid excess programming, he added.

Patrizio sent for more information but never built a formalized rating scheme to see how well UFO compared with other packages. He looked at one IBM offering, but that was "a batch-oriented thing," no comparison to UFO's on-line support. The initial UFO packaging was "rather limited," he said. However, Oxford added procedural language support and that "tremendously enhanced" the system so Novo acquired it.

The vendor offered two ways of installing the package: remotely, in which the user does all the work, or with support including a stand-up trainer. "We chose the latter path. I wanted to make sure we understood how it worked. If there were any problems, we'd settle them right away," he explained.

Pleased With Training

Patrizio was pleased with Oxford's approach in the training class. "We tried to get help with our priority application, but Oxford told us to do it our way: training wasn't supposed to be programming class."

The manager had all of his staff sit in on the training sessions and that had an unexpected benefit. Having been introduced to the teleprocessing environment and an easy way to work with it, Novo's batch-oriented staffers "suddenly realized they didn't need 10 years experience to do well in it."

The batch programmers were familiar with CRTs and they continue to write batch programs, "but they have the feeling they can cope with TP if the need or the opportunity arises." They'd been using source statement maintenance from IBM on the terminals, but now they were picking up the attributes of the 3270.

Even though the teleprocessing application program end-product looks very complicated, they could see it was really quite simple, Patrizio continued.

Anything as simple to use as UFO "has to have overhead," he admitted. The software is a dictionary-driven system and in a test comparing the speed of copying data from Isam files and from UFO files, UFO "came in about two seconds slower" but for Novo's purposes that "isn't all that big a deal."

In any case, UFO code is supporting customer inquiries at two customer locations where it is satisfying an immediate need and doing it well, according to Patrizio.

The manager semed to like the speed with which UFO can be used as much as any of the special capabilities it offers. He said his staff uses the package to develop ideas during application design time.

The center is a service unit for three or four subsidiaries of the Novo Corp. When these "customers" say they want something but then change their minds "it's not a disaster" to rearrange data elements with UFO, Patrizio said.

'Jobdoc' Tracks TSO Jobs, Run Books

HOUSTON — The Job Documentation System (Jobdoc) from Gulf Computer Sciences, Inc. is described as a series of programs operating under IBM's OS/360 or OS/VS for the centralization and control of computer jobs and documentation.

The system, which gains its on-line capabilities through an interface to IBM's Time-Sharing Option (TSO), keeps operators posted on what a job or program can do, what input is needed for it, how the work is run and what information can be obtained from it, according to a Gulf spokesman.

The software provides standardization and centralization, with all information available to authorized personnel at any specified location and with on-line instructions for obtaining it. A synopsis of all assembled data for each job contained in the system is also available, he added.

On-line inquiry and update facilities eliminate cards and card-handling operations on each job. On-line data entry and editing of stored documentation also eliminates the need for a run book, he continued.

By automating the documentation, the system frees the programmer from both the initial preparation and the equally important, and often equally burdensome, need to update the documentation, the spokesman claimed.

The instructions provided by Jobdoc include assistance to the job setup and control clerk on the one hand and help to cope with Abend/Restart situations on the other.

The system also includes systematic control for disaster planning including identification of critical jobs and their degree of criticality as defined by the user. Part of the disaster support includes creation of a special portable data base to get work started, if required, in a new location.

The package includes Cobol and ALC modules in source form for compilation and input to IBM's IEBUPDTE routine; reader-interpreter and analysis modules in object form; and manuals describing the system.

Organizations willing to serve as demonstration points for Jobdoc can have the product installed for a one-time cost of $17,000. As of Sept. 1, the cost will go up to $21,500, the Gulf spokesman said from 1775 St. James Place, Suite 160, Houston, Texas 77056.

'Blis/Cobol' Interfaces Trident Disks, Novas

WINTER PARK, Fla. — The Blis/Cobol operating system has been enhanced to support Trident disk systems as well as other peripherals attached to Data General Corp. Nova and Eclipse systems, according to the Blis vendor, Information Processing, Inc. (IPI).

Among the Trident units supported in this upgrade are the T-25, T-50, T-80, T-200 and T-300. With them in place, Blis/Cobol users can work with indexed files containing up to 16 million records, with 500M bytes each, spanning eight drives, IPI claimed.

The software enables users to retrieve data from the files sequentially, randomly or by alphabetic keys. Working from the ANS Cobol-74 compiler that makes up the system's backbone, users can access records by four different alphabetic keys, the spokesman stated.

While Blis/Cobol provides the software interface between the Trident disks and the DG minicomputers, the hardware linkage is provided by Minicomputer Technology 802A controllers.

The multiuser Blis/Cobol operating system includes record-level lockouts to avoid simultaneous updates. Indexes are maintained dynamically to avoid the need for periodic file reorganizations, the company noted.

The stand-alone software system can be used on DG computers with 16K words, but 32K words is a better environment for it, the spokesman said. Blis/Cobol costs $4,000, he added from Suite 320, 1850 Lee Road, Winter Park, Fla.32789.

Correction

NEW YORK — Copies of the June 1977 issue of the *SigCSE Bulletin*, cited in "ACM Programmer Curriculum Sets College Guidelines" [CW, June 27], are available for $2 each, according to the Association for Computing Machinery (ACM), 1133 Avenue of the Americas, New York, N.Y. 10036.

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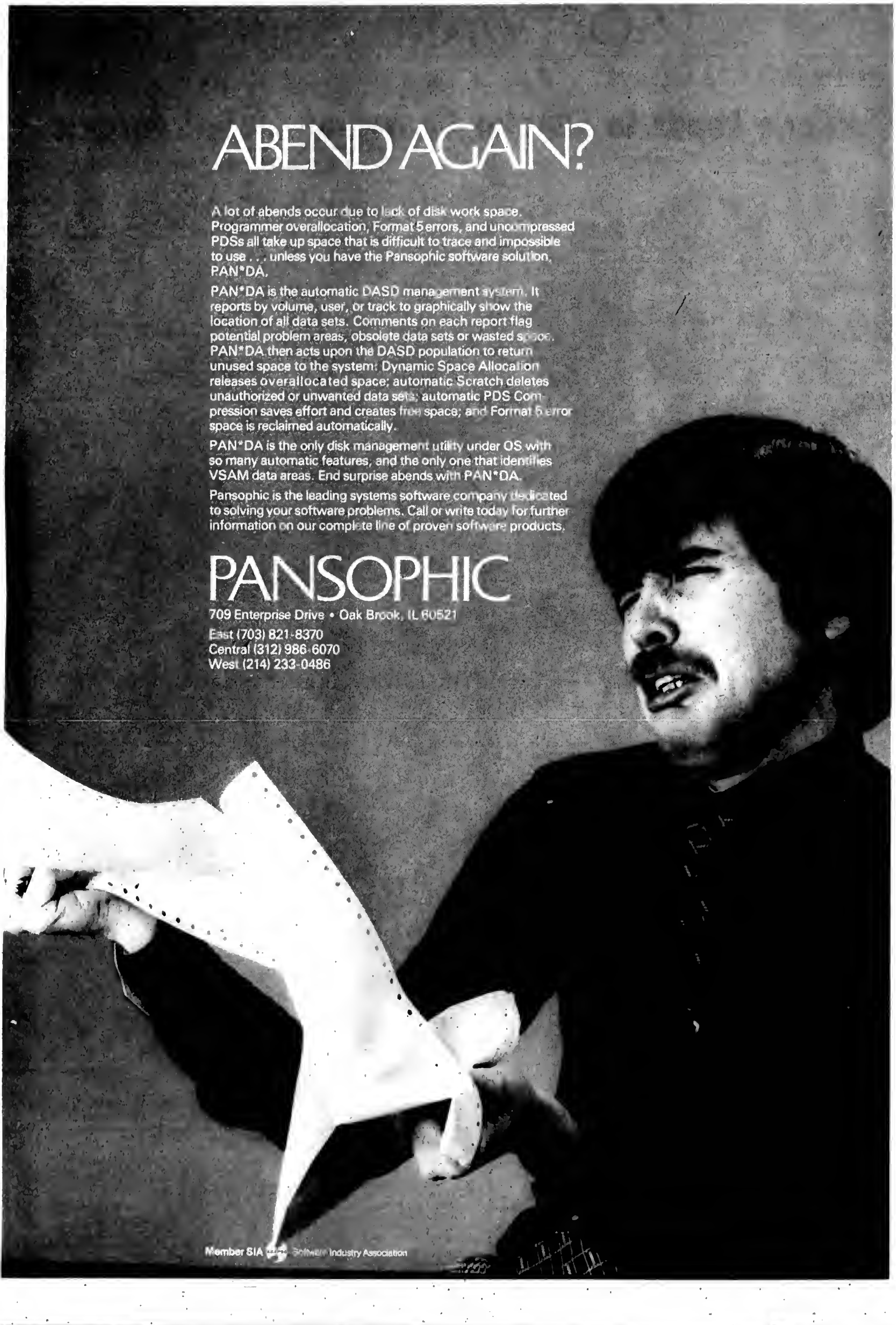

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Survey Flaws Seem Obvious. . . But Challenges Have Flaws Too

By Sam Levine
Special to Computerworld

In "New Ideas Sought to Bring Order to Package Surveys" [CW, Apr. 4] Don Leavitt raised pertinent questions concerning the value of the Datapro Honor Roll. He said the statistical sample used in rating the packages is too small and the honor roll only benefits those vendors "elected" to it. I agree on both counts.

One factor the article didn't address is the validity of the questions used to rate the packages. Specifically, Datapro's seven questions deal with overall satisfaction, throughput/efficiency, ease of installation, ease of use, documentation, vendor training and vendor technical support.

The respondee is asked to assign a weighted value to each question based on a 4.0 perfect scale — just like college grades. Unlike college grades, however, the scores are not based on an accurate measure, but rather on the opinion of the person answering the questionnaire.

There is no guarantee that person is the primary user of the package; consequently, he may not be in a position to accurately grade it. In addition, since the "grades" are purely subjective, I dare say they'd vary greatly depending on the mental frame of the person when he is answering the questionnaire.

The Datapro questions themselves are also ambiguous. What does "overall satisfaction" mean? Can a user really judge "throughput/efficiency" without accurately measuring it?

"Ease of installation" also puzzles me. Just about every vendor I've talked to will install the package (IBM is a large exception). So why would anyone care about how easy or hard it is to put the package on the computer? If Datapro means "ease of installation" to be a measure of machine time to install the package or program modification effort, it should say so.

The remaining four questions — ease of use, documentation, vendor technical support and vendor training — are equally ambiguous and misleading. Shops might have greatly different opinions concerning how easy a package is to use, how clear the documentation is or how good the vendor training was depending on the quality of the user's staff. As for technical support, well, vendors are only as good as their last performance.

Levine is a consultant in New York.

By Don Leavitt
Of the CW Staff

In fairness to the work Datapro puts into gathering its user ratings of proprietary software, I think Levine deserves a response.

Contrary to his understanding, for example, I have no gripe with the size of the statistical sample the researchers use. They send questionnaires by first class mail to 30,000 individuals drawn from a list indicating they have a substantial interest in DP. Even if half these recipients are not from using organizations, the base itself seems adequate.

I am concerned, however, about the minimal number of ratings they accept as a basis for possible inclusion on the Software Honor Roll. With the wide distribution of packages today, it is wrong to let as few as half a dozen raters "make or break" a package.

Happily, most of the 1976 "winners" had many times the minimum number of good ratings to qualify. Yet precisely that fact should encourage Datapro to boost its requirement in this respect.

DP Community Benefits

Incidentally, vendors "elected" to the honor roll are not the only beneficiaries. The whole DP community gains if the vendors compete — through enhancements, not handholding — to make sure their products show up well on such an open forum.

On the details of the rating scheme, Levine is right — they are subjective. If there were some accurate and objective measures, there'd be no need to check user experience. The basic problem, I think, is that installations and what they try to do with packages vary widely, and standard measures just don't apply.

But by gathering and averaging a good number of individual, admittedly subjective ratings, I think Datapro can come up with reasonably valid ratings on how well a product measures up in a typical (whatever that means) situation.

The real problem, and one that Levine recognizes too, is that Datapro has no control over who actually answers the questionnaire. I'd like to see a good solution to that one.

I agree the questions are ambiguous, but for the same reason the ratings are subjective: we have no fixed metrics applicable to software. Despite possible disagreement over detailed meanings of any term, however, most of us can appreciate the basic meaning of the final scores.

Because they are averaged, they probably reflect how well a package does in a typical situation. And it probably is reasonable to compare ratings of competing packages to see which seem worth evaluating in depth.

Any survey that can help users that much has to be a welcome addition to the community.

Card Readers Tied To MDS Series 1200

PARSIPPANY, N.Y. — Mohawk Data Sciences Corp. (MDS) has enhanced its System 1200 data entry/communications software to support the use of card readers as well as keyboards for input operations.

The changes have been included in both the stand-alone Key-Display Operating System (KDOS) for data entry and the "Concurrent" version, which allows communications functions to proceed at the same time, according to a spokesman.

The upgrade lets users move data from a card reader directly to the system's disk file, eliminating tape transfer operations, or directly to a communications line to a host mainframe, he explained.

With the enhanced software in place, the user can attach either a Mohawk Model 2453, which has a top speed of 400 card/min, or the 2455, which can operate at 1,000 card/min, he added.

Communications with the mainframe is handled under IBM's 2780 or 3780 protocol. System 1200 also allows users to transmit data from disk or tape under those protocols or under 2968 protocol and to receive data on tapes, disks or printers.

MDS is at 1599 Littleton Road, Parsippany, N.J. 07054.

XCS Offers Price Break On Distributor Service

EL SEGUNDO, Calif.— Xerox Computer Services (XCS) has reduced prices approximately 10% on the Xerox 1-2-3 System, an on-line service for wholesale distributors. Cost of the service can be as low as $750/mo, according to a spokesman.

The 1-2-3 System provides integrated order processing, inventory control, accounts receivable and sales analysis applications for distributors with annual sales as low as $500,000, he explained.

The $750/mo figure is a minimum charge for use of the system but seems to apply to many of the users on this "start-up" service, he added.

XCS provides remote computing network facilities throughout much of the country and is headquartered here at 701 South Aviation Blvd., El Segundo, Calif. 90245.

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Data Briefs

Metric Publication Lists Test Equipment

BURLINGAME, Calif. — Metric Resources Corp. has published an eight-page brochure covering rental and lease of telecommunications and electronics test equipment.

The brochure lists more than 400 model numbers, descriptions and monthly rental rates of test sets for data communications, computer/protocol, carrier, cable fault locating, microwave, mobile communications and video equipment, according to the firm.

A separate section presents a brief economic analysis of the user's "rent vs. buy decision," illustrated with a graph of effective monthly equipment expenses.

The brochure offers a convenient listing of equipment available, but does not offer in-depth product descriptions.

Metric Resources is located at 822 Airport Blvd., Burlingame, Calif. 94010.

Lear Cuts ADM-3 Price

ANAHEIM, Calif. — The Data Products Group of Lear Siegler's Electronic Instrumentation Division has dropped the price of ADM-3 Dumb Terminal $100 and included a once-optional feature in the lower cost.

The base price is now $895. In addition, the 24-line, 1,920-char. display capability, formerly an option at $250, has become a standard item, according to the firm.

TCTS Expands Service

OTTAWA, Ont. — Four serving areas have been added to The Dataroute, the digital data network provided by The Computer Communications Group of the TransCanada Telephone System (TCTS).

The addition of Brantford, Chatham and St. Catharines in Ontario and Charlottetown in Prince Edward Island on July 1 brought the number of Dataroute serving areas to 36.

For Business Users

Datacom Inaugurates Usage-Sensitive Net

By John P. Hebert
Of the CW Staff

MEMPHIS, Tenn.— The Datacom Co. based here is offering a usage-sensitive data communications network alternative for business users which reportedly can interface any terminal protocol.

The nonprofit wholly-owned subsidiary of Data Communications Corp. (DCC) here operates a nonregulated national packet-switched network service which converts users' terminal-to-CPU data communications into a standard speed and code format. The service utilizes microprocessor-based communications controllers developed by Datacom and Universal Data Systems, Inc., according to a Datacom spokesman.

Any users opting for the full-duplex transmission network service can save money compared to the costs of using any other carriers' network, he claimed.

The network uses leased, unconditioned voice-grade lines from AT&T to transmit users' data at 4,800 bit/sec, he said.

Because the network was originally developed for — and is still shared by — users of the parent company's Broadcast Industry Automation System (Bias), business users are given a discount on data transmitted between the hours of 8 p.m. and 6 a.m. the following morning, according to the spokesman.

Datacom transmits users' data in 132-character packets. Subscribers are charged to transmit kilopackets of data anywhere in the continental U.S. at a rate of $1.70 per kilopacket during the daytime hours (between 6 a.m. and 8 p.m.) and $.85/kilopacket at night, he said.

Users, however, are not restricted as to when they are able to access and use the network facilities, the spokesman explained.

To access the network, users must either buy or rent a microprocessor "black box" from Datacom for $2,000 or about $100/mo on a one-year lease, he said.

Procuring a line interface between the users' terminal or CPU and the network nodes in 85 U.S. cities is up to the user and is not an extra network cost, according to the spokesman.

The company guarantees users their buffers will arrive at destination; and the network also offers other features, he said.

Datacom may upgrade the network to operate at speeds above 4,800 bit/sec if there is a need, he said, adding the company is looking into the possibility of changing from voice-grade lines to Bell's Dataphone Digital Service digital line offering.

The Datacom Co. is located at 3000 Directors Row, Executive Plaza, Memphis, Tenn. 38131.

For January Operation

ITT Readies Shared User Network

By John P. Hebert
Of the CW Staff

NEW YORK — ITT Corporate Communications Services, Inc. (ITT-CCS) late last month received approval from the Federal Communications Commission (FCC) for an interstate common carrier service for primarily voice but also business data communications users.

In addition, CCS has already installed the first and largest of its planned nationwide computerized telephone and data switching centers here for what it calls the Switched Private Network Service (SPNS).

CCS filed with the FCC in May 1976 for SPNS, which is aimed at low- to medium-sized users.

Its Corporate Communications Switching Equipment (CCSE) offering for large-volume users did not require FCC approval [May 31, 1976].

The company expects to launch the two services by Jan. 1, according to a CCS spokesman.

SPNS will provide four-wire switched private line facilities on a dedicated subscriber-to-subscriber basis utilizing ITT-CCS switches and shared-user, leased transmission lines between cities, the company stated.

Since the SPNS network lines are leased from other carriers, CCS will guarantee 4,800 bit/sec transmission for data users, the spokesman noted.

SPNS features will include privacy, detailed per-call billing, traffic statistics, desk-to-desk dialing, abbreviated dialing, hotline service, conference calls and project billing for specific subbilling accounts, according to CCS.

Voice-grade telecommunications services will be provided through the SPNS network switching-center and tariff-extension cities, which will include Atlanta, Baltimore, Boston, Chicago, Dallas, Los Angeles, Milwaukee, New York, Philadelphia, San Diego, San Francisco and Washington, D.C., according to a CCS spokesman.

ITT's seven proposed switching centers in the system are designed to provide users with network management controls of line and trunk equipment on a real-time basis, he said.

CCS anticipates filing rates with the FCC for

(Continued on Page 25)

'Calrs' Diagnoses Phone Faults

HAMILTON, Ont. — A service operator for Bell Canada here responds to telephone subscriber trouble calls by using a Westinghouse Canada Ltd. W1600 CRT terminal to input the subscriber's telephone number into Bell's Centralized Automated Loop Reporting System (Calrs).

Calrs is designed to reduce to minutes the time required to diagnose and take corrective procedures on customer telephone or telephone line problems.

Mini Technology

The system uses minicomputer technology to store and retrieve information and to perform up to 15 measurements plus operating checks to diagnose faults in customer equipment, according to Westinghouse.

The operator of the computer terminal asks a series of questions and then types the subscriber's answers into the system, which diagnoses the problem. More complicated problems are transferred from the operator's terminal to a senior repair technician for analysis and solution, Westinghouse said.

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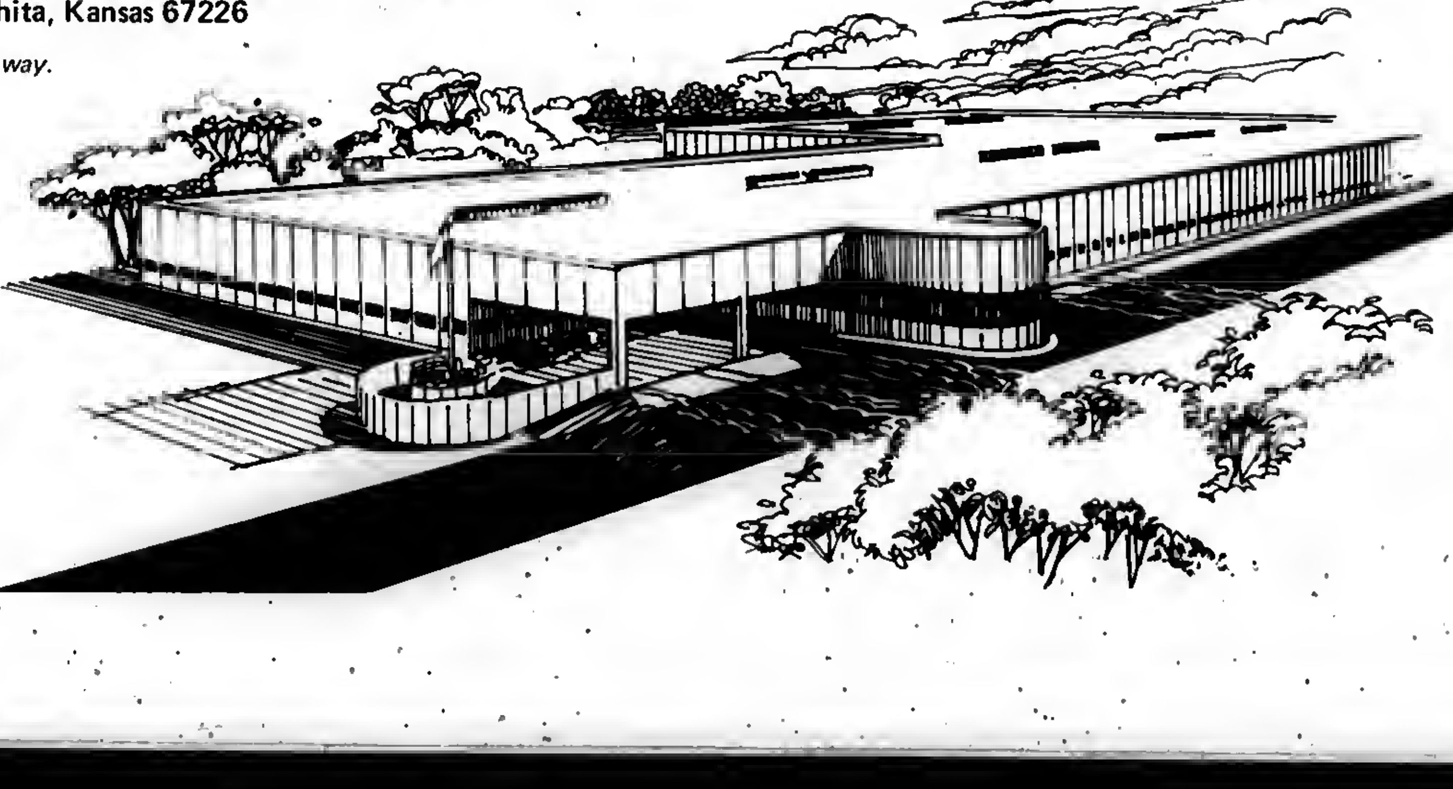

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Firms Set Sights on Competing With IBM High-Capacity CRTs

By John P. Hebert
Of the CW Staff

DALLAS — Shortly after IBM announced a 3,440-character-capacity screen for some 3270 series CRT terminals, Four-Phase Systems, Inc. and Harris Corp. tested their competitive reflexes and met the mainframer's challenge.

At last month's National Computer Conference here, Four-Phase demonstrated an operational IBM 3270-compatihle CRT with the 43-line by 80-char./line display format. The terminal was operating as part of a live demonstration of the company's stand-alone System IV/70 operating with IBM 3270 simulation software, according to a company spokesman.

Four-Phase was demonstrating the large-capacity CRT solely as a competitive response to IBM's announced intentions. The terminal does not yet have a model name, price or delivery schedule, the spokesman stated.

The company also did not research the advantages or disadvantages to users of the 3,440-character display, the spokesman admitted. He said it did, however, alter the necessary electronics in the terminal within two weeks after IBM announced the model 3276 and 3278 additions to the 3270 CRT family [CW, May 23].

Harris also announced a large-capacity 3270-compatible CRT terminal, but did not show its engineering prototype to NCC attendees.

IBM's 3276 and 3278, however, have not been shown or demonstrated publicly. The terminals will not be available until well into 1978, according to IBM.

According to the Four-Phase spokesman, his company has no obligation to manufacture or deliver such a terminal to users until IBM does so.

The major reason for producing 3,440-character terminals, an industry source pointed out, is to display the contents of one standard typewritten, single-spaced page on the CRT screen.

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WU data services
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ITT Readying Net For January Startup

(Continued from Page 23)

the SPNS services late this month or in early August, the spokesman said.

"Typical rates which might be expected" were filed with the FCC last year with the SPNS application, but the "whole world of communications has changed since that time," he pointed out.

Basically, SPNS users can expect to pay a monthly service charge, a one-time installation charge and a user charge varying with distance of network services, in addition to supplying their own modems, according to the spokesman.

Last year, the proposed, tentative charges filed with the application to the FCC showed a local access charge of $30/mo per channel with an $85 one-time installation charge. Usage charge per port was expected to be a minimum of $120/mo.

Beyond the minimum rates, the 1976 CCS application referred to eight categories based on distance and time SPNS is used ranging from 3 cent/min from one to 400 miles up to 39 cent/min at distances over 2,500 miles [CW, May 31, 1976].

These charges, however, could he much higher or lower than rates SPNS users will he charged when the network is operational, the spokesman cautioned.

The company's second offering, CCSE, will provide the user only with access to the high-volume-capacity switching equipment.

It will require that a large user contract for the use of a minimum number of ports; hilling will be based on a monthly per-port charge plus a one-ime installation charge for each port used, CCS said.

In 1976, the minimum number of ports was expected to be 96, the installation fee $60/port and the monthly charge was $120/mo port [CW, May 31, 1976].

CCSE will allow large telecommunications users to custom-design their own network using the ITT-CCS switching equipment in conjunction with transmission facilities they own or lease from any other common carrier.

CCS is located at One Whitehall St., New York, N.Y.

Pacer 103 Gets Interface

RIDGEFIELD, Conn.— Digitech Data Industries, Inc. has announced an interface option which reportedly allows their Pacer Model 103 data line monitor and simulator to operate on 50 kbit/sec circuits.

The interface consists of two adapters which connect to the modem and terminal side of the line, the company said.

The pair of adapters costs $995, Digitech said from 66 Grove St., Ridgefield, Conn. 06877.

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Storage Capacity Up 75%

Arkansas 'Promoting Deflation' With Disk Upgrade

LITTLE ROCK, Ark. — "It's ironic; we're actually promoting deflation," according to James T. Randolph, director of Arkansas' department of computer services. Randolph was discussing the state's disk storage equipment.

With the installation of Memorex Corp. 200M-byte disk drives to replace the previous 100M-byte drives supplied by IBM with the state's two 370 CPUs, storage capacity of the disk subsystems has been increased by 75%, while floor space requirements have been reduced by over 50%, Randolph said.

At the same time, the state is able to charge all of its agencies 5% less for central DP services, he said, noting that with the expanded capacity, tasks such as a new sales tax application can now be added to the system.

A detailed 30-day study by an evaluation team of computer technicians ultimately led to the decision to award a contract to Memorex for its Model 3675 200M-byte disk storage drives, according to Randolph. In response to the state's request for proposal to four vendors, three responded as willing to undergo evaluation tests in accordance with the 95% availability requirements then set by the state department of computer services, he said.

Limiting Factors

Managers at the state's DP facility had several constraining factors affecting the decision to upgrade the disk subsystem, including limited floor space and an air conditioning system already at its peak, Hall explained. In addition, the new equipment had to meet the 95% availability criterion, allowing only 5% downtime for all maintenance, including preventive maintenance, over the 30-day test period.

In more recent months, the state has increased the availability requirement for all of its DP production equipment to 98%, a requirement the disk subsystem has also met successfully, according to a Memorex spokesman.

The state's disk storage subsystem, which is shared between a 370/158 and a 370/145, both of which operate under Release 6 of OS/VS-1, consists of four strings of Memorex 3675 disk drives and 3673 controllers. Interfacing between the Memorex strings and the IBM processors is accomplished through a pair of Memorex 3672 storage control units.

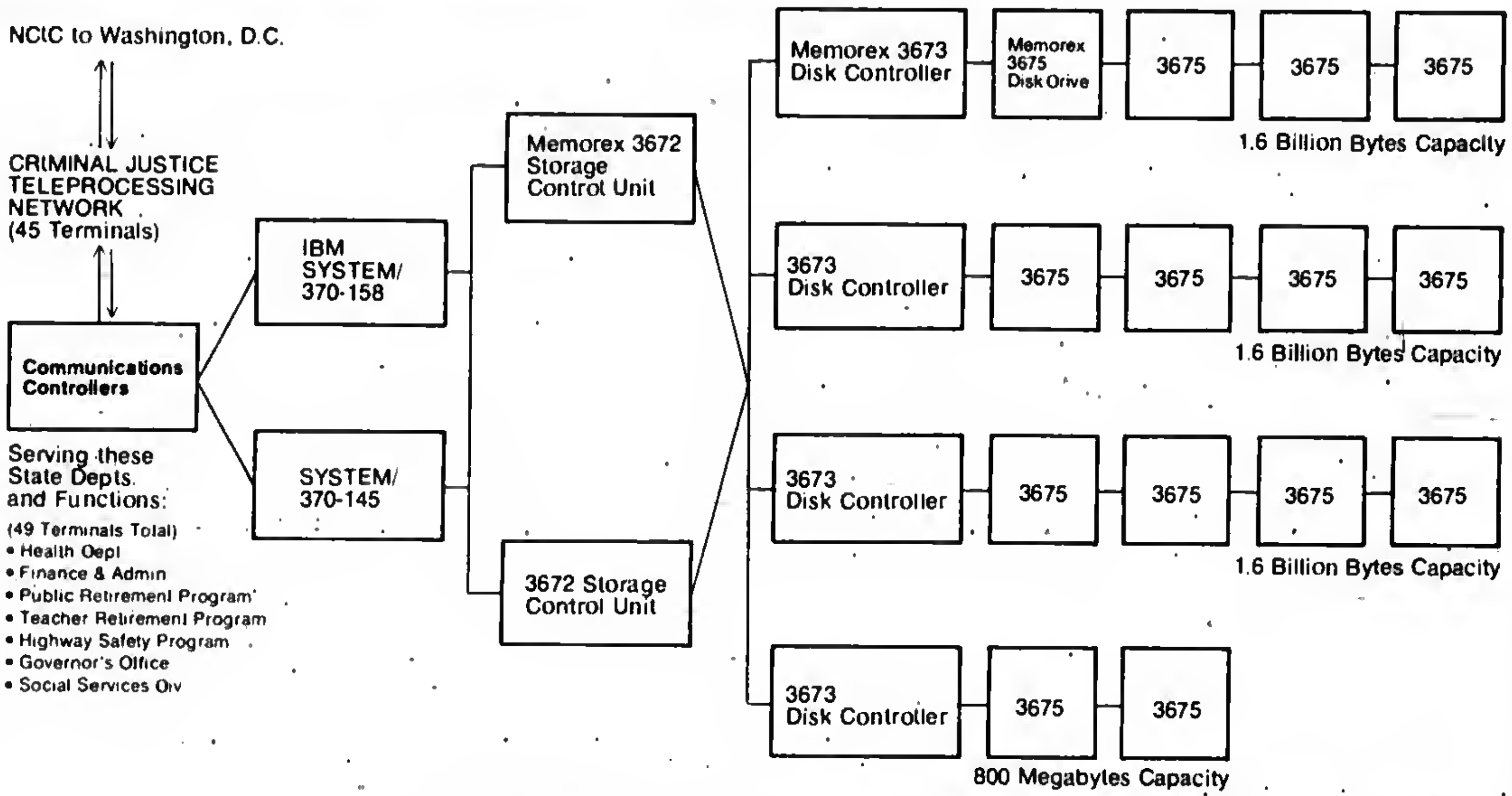
Total capacity of the 28-spindle subsystem is 5.6 billion bytes. The predecessor disk subsystem, consisting of 32 IBM 100M-byte disk drives, had a capacity of 3.2 billion bytes. Air conditioning requirements for the Memorex equipment remain about the same as for the replaced drives, Hall indicated.

The Memorex drives were introduced to the facility gradually, according to Hall. At first, one string of eight spindles were installed, and at two-week intervals the remaining three strings were added. The four 3673 disk controllers are connected to the two 3672 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

"We can perform string switching between CPU channels and switch control units as well," Hall explained. "That is, if one controller develops problems, the other one is switched to carry more of the load. This capability ensures that we never lose an entire portion of the disk subsystem. Each 3672 has the capability to read all units in the subsystem."

The emphasis on reliability and backup has been maintained largely because the system serves the state's Criminal Justice and Highway Safety Information Network. This network operates 49 terminals located at state and local police departments and at the state's Criminal Justice Division, and it connects to the National Crime Informa-

(Continued on Page 30)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State of Arkansas Central Computer Facility at Little Rock

Chart Courtesy of Memorex Corp.

Long-Range DP Planning Seen Business Challenge

DALLAS — Users of "information resources" need to do more long-range planning, but such planning will "challenge some basic ways we do business," Harvey L. Poppel, a consultant with Booz, Allen & Hamilton, Inc.

Maybe such planning will even cause some organizational changes, according to Poppel.

Information resources encompass much more than just DP, Poppel contended, noting "our professions go beyond the computer itself and encompass all the information resources of a firm."

In the 20 years of computer use, he said the technology had moved forward at a "startling" pace, but the ability of manufacturers to change that technology into products has lagged.

"But even more importantly, the ability to manage the technology has lagged way behind both the technology and the ability of manufacturers to translate that technology into products," Poppel said.

There are seven basic reasons for this, Poppel stated. There has been a failure of the people using the systems to understand the business they are in and a failure to grasp the total problem in using information resources.

In addition, DPers have failed to adequately explore alternatives, properly estimate development efforts in the area and properly anticipate the resistance to such projects, Poppel charged.

Finally, there has been a failure to gauge the impact of information resources and a failure to control the results of information resource efforts.

Today, users are facing an even "more difficult environment" where DP, communications processing and word processing are all interacting and affecting "human processing" within organizations, Poppel suggested.

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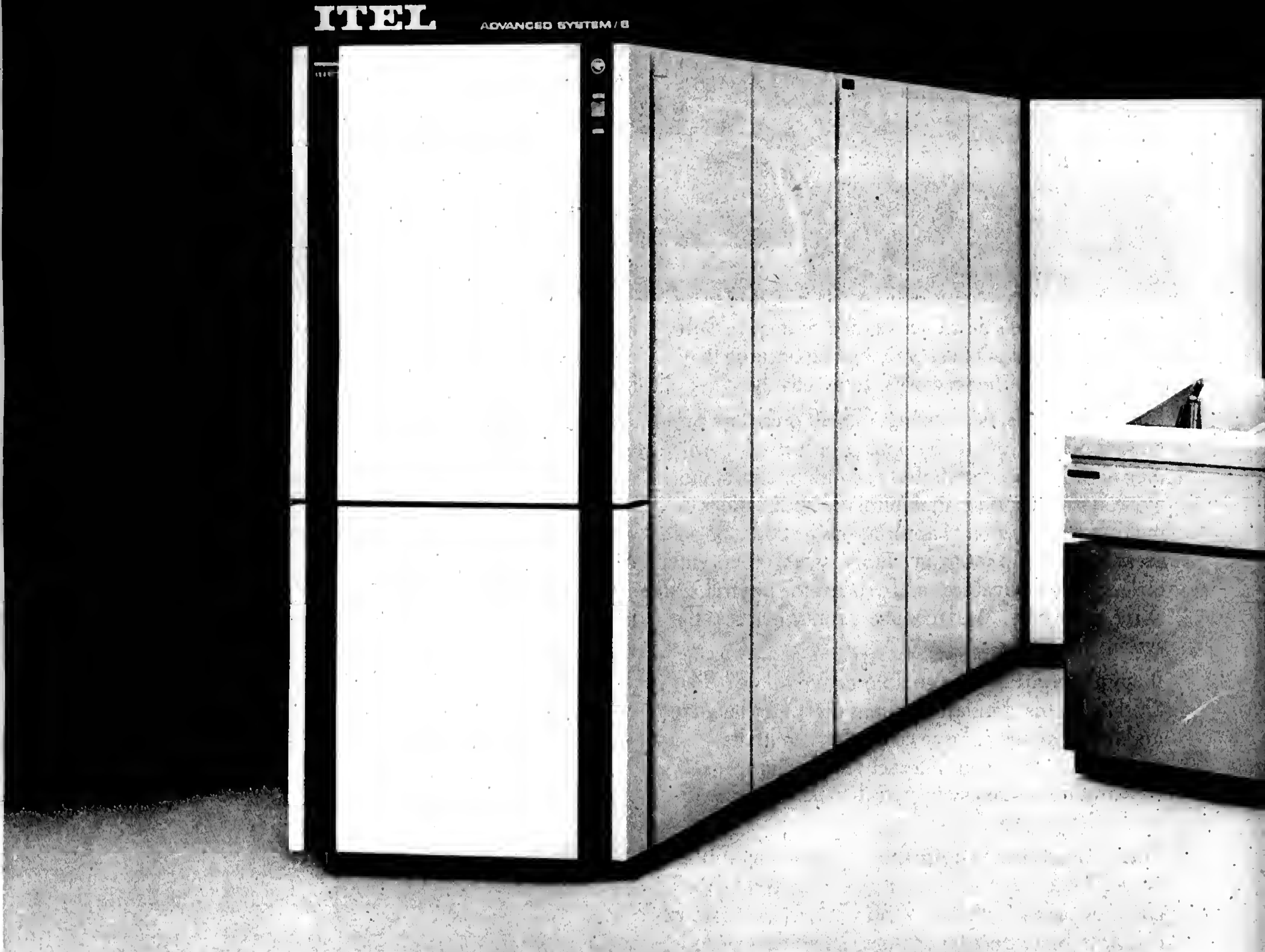

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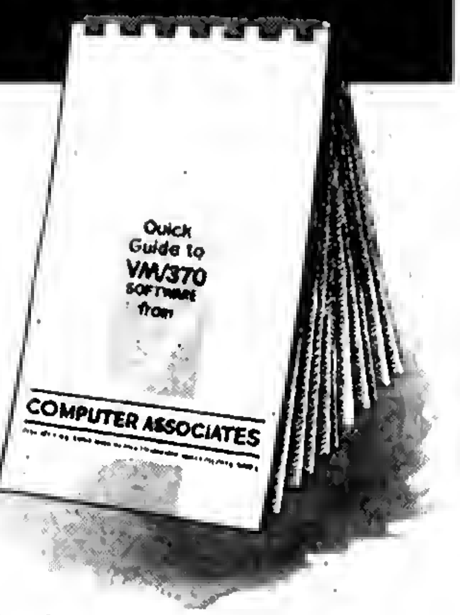

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Inquiry System Helps Firm Style Product Line

MERRIAM, Kan. — A terminal-based inquiry system is helping the H.D. Lee Co., Inc. plan, monitor and react to the ever-changing needs of the apparel industry. The system meets these needs by allowing personnel to access files and ask spontaneous questions regarding all aspects of the company's clothing business.

With other systems, a program has to be written and stored for each specific question that is to be asked and answered. But with the system Lee uses, IBM's Interactive Query and Report Processor (IQRP), there is virtually no limit to the type and variety of questions: if the facts needed to answer them are on file, the system provides the answer in about 20 seconds. This can lead to another question, another answer, etc., in a conversational "what if" sequence, if desired, according to Peter D. Day, manager of merchandise planning.

To ensure that those facts are there for merchandise planning, for example, Lee has developed a file of sales history for previous seasons. Each lot number has been identified by some 20 variables. The system permits Lee management to look at trends by one or any combination of these variables. Also stored is data on the current season, including sales, forecasts, production quantities and a projection of sales data.

Clearer Picture

With this information available to be shuffled and manipulated as the terminal user wants, the system gives Lee management a view of the overall merchandising structure and complexity that was impossible to achieve before, Day said. It also provides a capability to survey and define, to clarify specific merchandising objectives and to analyze whether these objectives are being achieved.

"In the apparel industry we all recognize that mistakes lead to expensive obsolescence," Day said. "But since IQRP was implemetned in the spring of 1976 it has helped us make the positive decisions that generate profits, not mistakes," he added.

"For example, if we are to do the most effective job of planning our product line, making our piece-goods commitments, gearing up our manufacturing plans and sending our salesmen off in the right directions, we must have a good idea of how successfully each specific product classification sold in past years. But we must also look for ways of defining the product category in terms of what we believe current market conditions will be, not as we would have defined things two years ago," Day explained.

"Through its flexibility, IQRP enables someone like me who knows nothing about DP, to sit at an IBM 3270 video display terminal and interpret history so that we can redefine each marketing classification as it should be today. This was impractical to do manually," he noted.

"In short," Day said, "in preseason planning, the system enables us to formulate overall sales goals by product categories and give merchandise assignments, by type and quantity, of product needed to yield the desired goals by line."

Further, the data enables Lee personnel to develop a detailed merchandise planning report. It is set up by fashion group and within each group, by a breakdown of units, percentage to total for the season, count and yield — by month for the past six seasons, then the forecast for the next two seasons.

Lee managers can look at these figures over time and make a forecast through the next season by fashion group and by total for the division. Fashion groups change, of course, and IQRP enables Lee to change with them easily. Trying to do so with manual data would be difficult, Day noted.

"We can also do price-point analysis, breakdown fashion group forecasting by fabric type and tell the merchandiser what his budget is by each fabric type," he added. "Thus, we can start with the company budget for the year, then break it down by division, by season, by fashion group and by fabric type."

The system is also of value outside the merchandising area. For example, purchasing personnel needed to make a long-range commitment on corduroy. Therefore, Day just keyed in the words "subtotal corduroy by season" and the terminal displayed the needs companywide by season, plus an 18-month history of corduroy usage. By looking at trends, he could derive a reasonably accurate forecast.

In addition to preseason planning, Lee personnel use IQRP in season, mainly to summarize it into "blocks," which they use to compare with planned production by group and see immediately where problems of under- or overforecasting exist. Then they can turn again to the system and see, by lot number, specifically where the problem areas are — or they can look at the problem by a fashion group, fabric or type of garment.

"We can see what's going strong and boost its production, or what isn't and cut its production" Day said. "The system can also produce 'exception' data, such as a list of all items exceeding projections by 'X' percent, or falling below projected sales by 'Y' percent. The printout is generated by our IBM 370/158 and delivered to the planning department within about 30 minutes," he indicated.

"However, IQRP is not simply exception reporting," he claimed, "because it enables us to look at everything we want to. It's more of a management screening device. If you build the information file right, and we think we have, its potential is tremendous."

All data bases are updated at least weekly and some of the files, such as customer inquiry information, are updated daily. IQRP is also used:

- To produce accounts receivable data — such as the top 10 accounts in terms of purchases or a listing of those with certain credit problems.
- For checking raw material receipts, tyically to be certain they will meet production planning needs.
- For order status, usually on the day's expected shipments.
- By the DP department to check stored prices.

State's Disk Upgrade 'Promotes Deflation'

(Continued from Page 26)

tion Center (NCIC) in Washington, D.C.

The network permits immediate dissemination of data on crime and other vital data related to law enforcement and judicial activities, according to a spokesman.

Another user of the state's central DP facility is the Finance and Administration Department, which is responsible for budgets, accounting, drivers' licenses, motor vehicles, taxing and payroll.

Addition of the IBM IMS software, now possible because of the increased disk storage capacity, will allow support of the state's sales tax system. About 10 terminals will be installed for inquiry, correction of records and review of revenue accounts, he said.

Still other departments and functions supported by the facility include the state Social Security Division, the Governor's Office, the Teacher and Public Retirement Programs, Highway Safety Program, State Treasurer's Office and the Department of Corrections.

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Textile Rental Companies Cooperate on Mini Venture

By Esther Surden
Of the CW Staff

INDIANAPOLIS — It's sometimes difficult for a small business person operating within the confines of his specialization to find a DP system that fits his needs from among those offered by traditional minicomputer vendors.

So Commercial Towel and Uniform Service, Inc., here, a textile rental firm, took a different approach, according to Theodore Kline, vice-president.

The firm turned to a consultant familiar with both DP and the particular needs of the textile rental industry and then, with several other firms, underwrote the development of a turnkey system designed to fit textile rental industry's needs.

Each of the firms put up $25,000 to develop the small business system, in a venture that seems to have paid off well for the companies involved.

The mini was just recently installed, Kline noted, and is currently running only the route accounting and accounts receivable application. Future applications that should be running shortly include management information and payroll, Kline added.

Firm's Automation Roots

Like many small businesses, Commercial began automating its office with the installation of tabulating equipment some 15 years ago. Like others, the firm outgrew this equipment, so Kline began looking around for an alternative.

Although an industry-specific service bureau does exist, the firm thought it "expensive and not flexible" to take this route and so Commercial decided on an in-house system, he said.

But the expense of an in-house system configured exactly to the firm's requirements would have been exorbitant.

Commercial wasn't sure what to do until it turned to Markman and Associates of Bala Cynwyd, Pa., which specializes in DP consulting in the textile rental field. The consultants, Herbert Markman and Edward J. Keegan, had a reputation in the industry, Kline noted.

They suggested pooling resources with four other small firms to come up with a system, Markman explained. It seemed like a good idea, so the five companies got together to determine some general criteria for their system.

First, they wanted a system that would not only be adequate for present needs but would be expandable without reprogramming. The system also had to use state-of-the-art equipment, because none of the textile rental firms wanted to outgrow it too quickly or find it obsoleted as soon as it was installed.

All of the companies wanted the mini to be easily operated by present employees.

The selection of a vendor was left up to the consulting firm. "We have no one on our staff who has that kind of expertise," Kline explained.

The consulting firm then began its consideration of minicomputer gear. "We did a survey of vendors," Markman recalled; and the list was narrowed to either Hewlett-Packard or Data General Corp. because, among other reasons, "we wanted a financially sound vendor, someone who could give us a consistent supply."

HP "was not price-competitive at that time," he noted, so the firm chose a DG Nova or Eclipse as the basis of the system that was to be installed in each of the five firms. The consultants "sent us all the information and eliminated" all the vendors who did not qualify, Kline noted.

The installation at Commercial includes a 96K Nova 3 CPU with 92M bytes of disk, a 300' line/min printer, magnetic tape unit and three CRTs.

The system handles about 6,000 customers. When completed, it should provide the firm with information about customer history according to route, plant, customer, service detail and items served, he said.

It will also generate reports such as contract renewal reports, customer analysis reports, general ledger, sales analysis, items served, and a new and lost business report.

It also interfaces to industry packages sponsored by the Linen Supply Association of America. One called Computer Assisted Route Development runs on a Control Data Corp. system at the association and is a system for structuring route and optimizing truck routes to minimize time and mileage. The turnkey system produces a tape that interfaces with this system.

The Turnkey — Part 1

System Choice Demands User Initiative

By Vincent Deschamps
Special to Computerworld

When it comes down to the bottom line, the responsibilities for the installation of a minicomputer-oriented system ultimately rest with the user.

It is the user who has more to lose than anyone else who may be involved in the selection and installation of a mini-oriented, "turnkey" business system. It is the user's business that is at stake. And, for the most part, it is the user who knows the least about which system is right or wrong for the business applications he wishes to automate.

This is the first installment of a three-part series dealing with successfully installing a turnkey minicomputer. Next week's installment, also addressed to first-time users, will detail the selection process, contractual arrangements, implementation procedures and schedules.

Remember, a vendor knows little about your particular business. If it claims to have a 'do-all" system for everybody, be suspicious. This may represent a seller's motivation — not necessarily a buyer's solution.

Keep your eyes open wide. Here are some rules to help keep you out of the "divorce court."

Potential users should cling to real-world situations. Avoid positions, thinking or statements that your predecessors have made, such as: "I told those computer people I didn't know anything"; "I expect this computer system to do everything in the world"; "The salesman assured me my computer would never run down"; and "Why can't we transmit data via satellite from New York to New Jersey?"

Minicomputer vendors prefer to sell only the systems they've developed, often disregarding users' hardware and software requirements.

Because of the relatively low price of minicomputer systems, as compared with the price tag for more powerful mainframe configurations, "off-the-shelf" systems provide manufacturers with the profitability and simplicity needed for effective marketing.

Customized systems represent add-on costs and a possible trap for the manufacturer to end up building unique systems. With the rise in price to include user options or specialized hardware and software, a custom system can end up like Mr. Blanding's dream house — costing as much as or more than a large system.

The right hardware may not be the cheapest. Hardware should be evaluated after the user analyzes his own business applications and volumes.

Another user trap may be either the underengineered or overengineered minicomputer system. It fails to live up to vendor salesmen's promises or loads the user up with gear he doesn't need now or in the foreseeable future.

The user also occasionally falls into the "Numero Uno" syndrome. Impressed by the size and reputation of the giant, he feels safe in selecting No. 1's gear, which may end up giving the user the biggest headache. The giants shy away from turnkey, total responsibility systems.

Distributors of minicomputers now offer only one manufacturer's product to the end user. It is not unusual for so-called turnkey systems to suddenly, after installation, require additional, expensive software or add-on peripherals to meet user requirements.

It's your business. An unsuccessful installation can put a user out of business. It's difficult and expensive to convert from an in-house system back to your previous sys-

(Continued on Page 33)

Datapro Report Tackles Mystery Of Implementing Small Systems

DELRAN, N.J. — A 14-page report "designed to take the mystery out of acquiring and implementing an effective small business system" is available from Datapro Research Corp.

The report provides an introduction to small business systems and practical advice on justifying, selecting, manning, installing and converting to the units.

For example, users are often confused by specifications such as processor speed given by manufacturers. "The critical factor for judging a business minicomputer's useful speed is usually the speed at which the input and output devices operate, because the processor can operate far faster than you can either enter the data or see the results printed," the article advised.

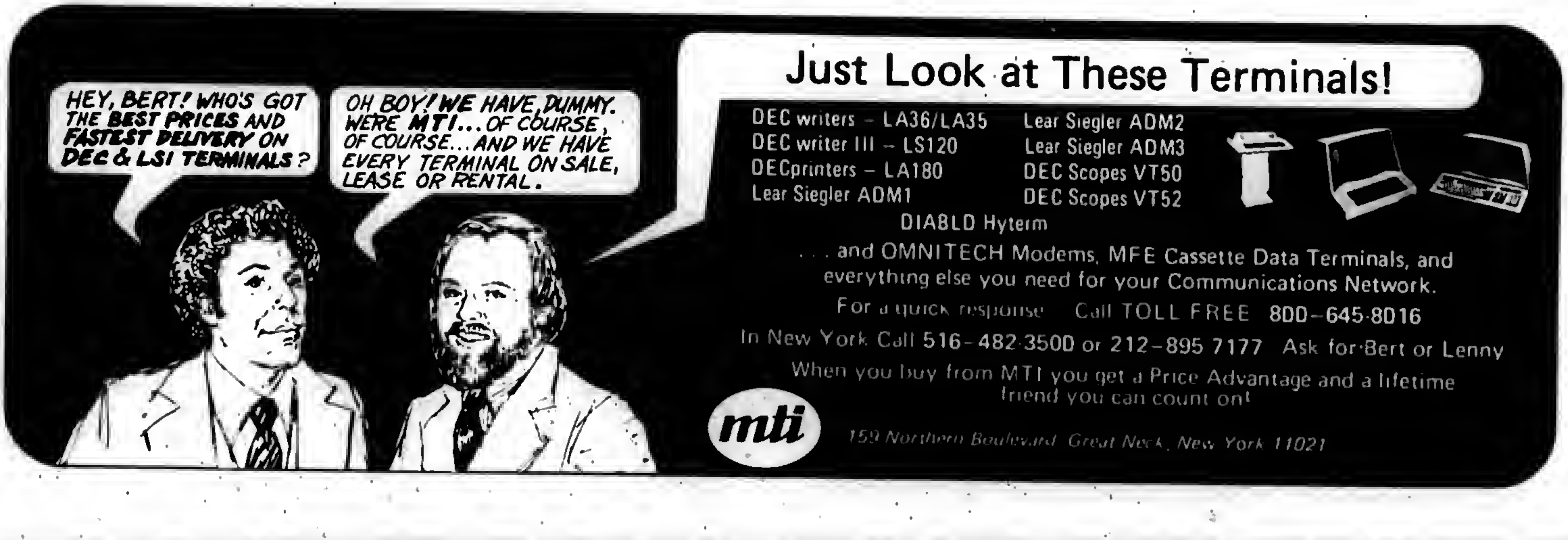
Business people shouldn't be lured to a small business system just because the business's competition are all getting one, the report continued. If the system can help out in an area that is "chronically over budget, late in meeting schedules or effectively operating without management control," a minicomputer can be of help, the researchers noted.

Call References

"By all means, call the companies on the vendor's reference lists," the report continued. It suggested a list of questions to ask, including "Were the programs delivered on time?" and "Is the servicing of the equipment prompt and effective?"

Take the system for a test drive and insist on making some postings yourself, the report advised. That way you can find out if it is easy to operate and lets you correct mistakes easily.

The report also covers such topics as the rent/buy decision, requests for proposals, feasibility studies, vendor selection and converting to the system. It costs $12 from the firm at 1805 Underwood Blvd., Delran, N.J. 08075.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Switch From Service Bureau Saves City $2,700/Year

By Esther Surden
Of the CW Staff

CARIBOU, Maine — The city of Caribou is saving an estimated $2,700 yearly in service bureau fees and has cut part-time personnel with the installation of a small business system.

The city, with a population of 11,000, needed a system to perform its tax assessment billing application, a complicated task that had formerly been handled manually, according to Terry St. Peter, city manager.

"We looked at several small machines," he said, including systems from Burroughs, NCR, Olivetti and Digital Equipment Corp. The city also looked at IBM, but less closely than the others, he indicated.

"We looked at hardware and software together. We had no computer programming capability here, so we needed to buy packages.

"The DEC Datasystem 310 seemed to be the closest thing to an IBM 3 but for less cost. It seemed to have the advantage of flexibility but on a basis that we could afford," he said.

Turnkey Vendor

The city got its system through a turnkey vendor, Datasystems of Maine. "They were just starting up at the time we started this venture. I believe we responded to some circular. We have never had any direct dealings with Digital," St. Peter said.

Prior to the installation of the system, the city had hired an extra part-time person assigned to help with the tax assessment chore.

The clerk helped the existing office staff type the evaluation books, then followed that up by typing the bills one at a time — all 5,000 of them.

"Then we had to type a collection book," which records the receipts from the taxpayers.

Now the system takes care of the entire application from start to finish, according to St. Peter.

The city is also performing a payroll application for the municipal employees and the school district on the small system. Previously, although the city was responsible for the school department's payroll, it was contracted out to a bank to be done on its computer.

"We did our own municipal payroll of 90 employees by hand," St. Peter said.

Both payrolls are now handled by the small business system via two payroll packages bought from Datasystems. It covers about 330 people on the city's payroll.

The city plans to put additional applications on the system and is training one of the city workers at DEC's programming school.

"We would expect to still buy packages, but I'm hoping that this will give us the capability to make some changes and maybe do some small programs here," St. Peter said.

A voter registration package is on the agenda to be placed on the system as soon as it is programmed in-house, he added.

"The sewer district is now purchasing a sewer billing package for use on the system as well," he noted.

Slow and Careful

"We have really gone about this slowly and carefully. We recognized we were on the ground floor with this software house that was just beginning; and we have really had to make some changes in order to develop the system to our satisfaction with their cooperation," St. Peter said.

It took a little longer than anticipated, he noted, but presented no real problems to the city.

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After Lightning Strikes

User Mixes Memory From Independents

By Frank Vaughan
Of the CW Staff

UPLAND, Ind. — Officials of a university computing center here are operating their minicomputer with add-on memories from two different outside vendors following a lightning strike that crippled the system last summer.

As a result of that lightning incident, Taylor University's Digital Equipment Corp. PDP 11/40 is currently operating with 28K words of DEC core, 32K words of Cambridge Memories, Inc. and 32K words of Fabri-tek add-on, according to John Kastelein, director of the computing center.

The university purchased its 11/40 in November 1973. The mini came configured with 28K of core and operated in that configuration until the summer of 1975 when the decision was made to use DEC's RSTS-E operating system, he said.

RSTS-E required 30K of memory, so the university purchased 32K from Cambridge to facilitate the operating system, he noted. No difficulties were encountered with the Cambridge add-on until the lighting strike crashed the system in June 1976.

"We had a DEC repairman come in and he worked on the system for three or four days and finally fixed the equipment. The Cambridge memory was knocked out, so we shipped the boards off to Cambridge and resigned ourselves to the fate of not being able to run our RSTS-E until they came back," Kastelein said.

Deadlines Closing In

One week after the boards were sent back, the Cambridge plant closed, because of financial difficulties, leaving the university with no memory, no commitments and no hope of meeting the requirements for grades, billing and registration deadlines that were drawing near.

"Since we had no idea what was going to happen at Cambridge, we made a commitment to purchase 32K from Fabri-Tek, providing they could loan us a system until they could ship a permanent replacement," Kestelein said.

"Fabri-Tek came through with the memory for us and we were on our feet again," he said.

Meanwhile, Cambridge Memories reopened and returned the lightning-struck boards to Taylor. The boards didn't work, so this time Kastelein shipped back boards, cage, power supply and everything, he said.

By December the university had both the Fabri-Tek and the Cambridge memories on-line and operating.

"At this point in time we are considering adding another 32K of Fabri-Tek, especially since the interfacing has gone so well," Kastelein said.

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Micos II for Small Businesses Uses 'Proven' System Software

ELMSFORD, N.Y. — Minicomputer Systems, Inc. has introduced a lower cost version of its Micos small business system.

The Micos II is "a stripped-down version" of the larger Micos system and is designed to satisfy user requirements for a flexible system with proven systems software as well as applications, the vendor said.

It is said to be comparable to the Microdata Corp. Express and IBM System 34 and can accommodate high-speed data transmission either from terminals or in system-to-system networks.

The basic system includes a 65K Data General Corp. Nova 3/4 CPU, a 10M-byte disk drive, line printer, CRT and the Micos II operating system. The system takes advantage of a recently introduced application software product called Application Programming Tools (APT), the company said.

APT offers the facility of faster program development thorugh the use of program generators for input screens, files and reports. The programming language used with APT is called Extensive Basic, an MCS spokesman added.

The Micos II system can be used in stand-alone mode or in distributed processing applications.

The basic system costs $28,750 from the firm at 525 Executive Blvd., Elmsford, N.Y. 10523.

Sykes Floppy Fits IBM 5100

ROCHESTER, N.Y. — The Comm-Stor/5100 is a floppy disk system designed for use with the IBM 5100 portable unit, according to its vendor, Sykes Datatronics, Inc.

The system is said to fill several needs unanswered by the IBM 5100: it produces floppy disk media readable by larger IBM systems and provides a random-access capability, a spokesman said.

The microprocessor-based unit plugs directly into the IBM 5100's serial I/O port without changes to the 5100 hardware or software, Sykes claimed.

The Comm-Stor comes supplied with a tape cartridge containing 10 Basic key files and 14 APL functions.

A single drive costs about $3,000 and a dual drive is priced at $4,000 from Sykes at 375 Orchard St., Rochester, N.Y. 14606.

Aris Turnkey Performs Publishing Applications

PLAINVIEW N.Y. — Aris Associates is offering a minicomputer-based system for publishers with 2,000 to 4,000 titles in inventory.

The system can handle 300 to 600 orders per day, order picking, invoicing and accounts receivable, according to the vendor.

In addition, subscription fulfillment for up to 10,000 subscribers per issue can be processed on an on-line basis for monthly and quarterly issues in combination with book orders, according to a spokesman.

Other applications that can be handled on the system include purchase order control, inventory replenishment, accounts payable and general ledger.

A typical system includes 64K of memory, two 10 million-character disk files, a 600 line/min printer and two CRTs and costs $85,000 including software.

A basic system with a low-speed printer and one CRT costs $39,000. The firm is located at 20 Central Park Road, Plainview, N.Y. 11803.

Turnkey Choice Needs Users' Involvement

(Continued from Page 31)

tem, even if it doesn't live up to your expectations.

Sometimes, the programming you've requested and had delivered may be extremely costly and absolutely useless if you change over. And sometimes the whole matter ends up in litigation.

The user might be helped by comparing the purchase or lease of a minicomputer to the purchase of life insurance, You would not purchase life insurance on the basis of price alone, without assessing what you really need to protect yourself for the future.

With this in mind, be skeptical of companies offering the moon for 50% less than everyone else and double-your-money-back guarantees. The business may not survive to get double its money back.

In summation, the user must:

- Know what he wants to accomplish.
- Take the time to have a feasibility study done or have the system designed correctly, the first time.
- Test the system before it is installed.
- Run his existing parallel system before stepping into the deep unknown.
- Install a system slowly, making certain that it meets or exceeds established benchmarks and criteria.
- Visit other existing user installations and obtain a candid critique of their experiences with the system.

The hardware should be:

- Capable of performing present tasks and future, realistic tasks for five to seven years.
- Manufactured by a reputable hardware manufacturer.
- Cost-justifiable.
- Complete without hidden, open-end software programming charges.
- Proven effective as quickly as possible.
- Delivered, installed and operational within a few weeks.

The vendor's responsibility is to:

- Know what his system can't do.
- Not oversell or undersell hardware.
- Understand the software job the user wants and either be prepared to do it at a fair price or tell the user to get someone who can do it — before he accepts the order.
- Avoid agreeing to unrealistic deadlines.
- Respect the customer.
- Treat the customer's business as if it were his own.

Deschamps is president of Turnkey Sales & Leasing, Inc., New York, N.Y.

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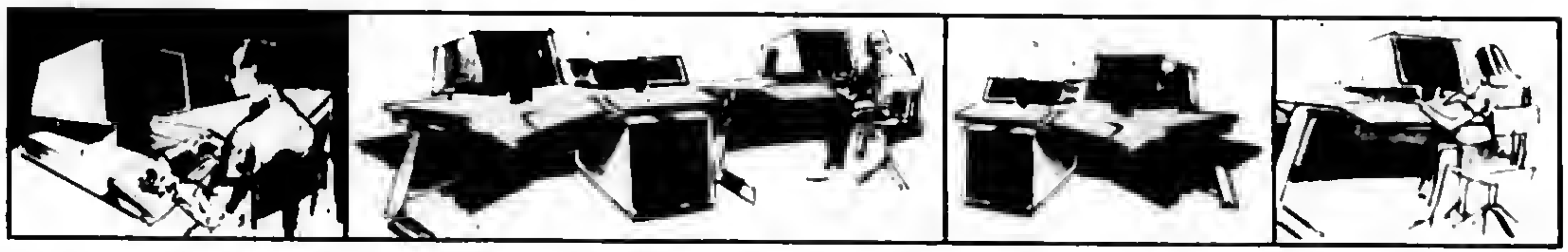

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Agents Match Clients, Houses With Help From Mini

Special to Computerworld

MELVILLE, N.Y. — A minicomputer has proven to be the key to opening doors for real estate agents here.

The system, located at Multiple Listing Service of Long Island, Inc. (MLS), has been credited with making the job of finding the right house for the right client more efficient.

MLS is an amalgamation of 659 participating offices in the resale home market in Queens, Nassau and Suffolk counties.

Of all the minicomputer's functions, the one that seems to trigger the most sales is a residential analysis done on the portable terminals the agents use. One broker reported the analysis has brought him a minimum of one home sale a month — at an average price of $60,000 — since the system was installed in April.

The analysis is often the clincher for the prospect who isn't sure he can afford the home, according to Val Mason of Butterfield Realty. The prospect is asked to provide the amount of his monthly rent and his estimated income. Once this data has been entered, the terminal prints out the price he can afford without spending more than he does now.

The terminal also prints the income tax benefits which will accrue based on his real estate tax rate and what his equity will be over the next five or 10 years based on amortization and a 5% increment for use "appreciation."

For example, a father of one earning $20,000 a year and paying $375 a month for rent finds that the same payment will bring him (after a downpayment of $9,000) a $45,000 house in which, based on the formula, he will have a $23,055.90 equity in five years and a $41,402 equity in 10 years.

According to realtors, the terminal's printout of these compilations is generally seized upon by the prospect for further study at home.

Listing Update

The bread-and-butter function of the system, and one which relates directly to MLS's prime function, is the listing update.

With the system, all listings received from the association are entered into the mini and are immediately available to the terminal subscribers. Members not on the system receive their information by messenger up to 24 hours later.

Because of the competitive edge it gives them, many of the subscribers request the listing updates three times a day.

Subscribing agents can also enter their prospects' requirements — such as number of rooms, baths and preferred neighborhood — by code so that another agent can search through them. If he has anything which satisfies the requirements, he can then contact the prospect's agent and suggest that a particular home listing with the calling agent be shown.

On the selling side, through its ability to list "comparables," what similar houses have sold for and are currently selling for, the system helps agents keep their clients attuned to reality.

When a homeowner comes in to list a house, he often has an inflated idea of what it will bring. The system can print out a list of comparable homes which are on the market now and against which his home is, in effect, competing.

Since it was introduced in April, the system has grown consistently. So far, approximately 18% of MLS's membership has signed up.

According to Margot Wolf, "that is about the number of agents and clerical employees which can be trained at MLS headquarters in Melville, Long Island."

The only charge for the system is $158 per month for the terminal.

One Complaint

The only complaint about the system is that when the new listings come in — seconds after they have been entered — they lack the photograph that is a standard part of the manually distributed hard copy.

However, as one broker pointed out, "We are beginning to find out that the lack of the photo is an advantage. If we get a match between a listing and what the prospect has asked for we can tell him we've got just what he asked for.

"Sometimes with the photograph we tell the prospect that and he says 'Yes. That's what I asked for, but I don't like it.' "

The system is a Hewlett-Packard 21MX, programmed by Realtronics, Inc. of McLean, Va.

Realtor Art Kaufman uses a portable terminal hooked up to a mini to find an appropriate home for his prospects.

Better Software for Minis Seen Future User Demand

By John P. Hebert
Of the CW Staff

WOBURN, Mass.— What is the most important trend in the area of minicomputers?

This question was asked of the four workshop session leaders at a meeting here recently and drew responses ranging from the need for better software to stiffer competition for vendors of only minicomputers.

Minicomputer vendors will have to provide better software and maintenance in the future to help the end user do his job in the easiest manner and bring up applications quickly, according to John Kogan, a consultant with Arthur Andersen & Co.

Eric Frey, president of Frey Associates, said he saw minicomputers doing exactly the same thing large machines were doing 10 years ago. As a result, Frey said, the future trend for minicomputers will be to grow the way mainframes have for the past 10 years.

Len Farano, executive vice-president of Gambit Management Strategies, Inc., saw two trends. One was a greater awareness on the part of users in making business decisions.

Shake-Out Predicted

Second, the arrival of mainframers in the minicomputer marketplace will bring about a "shake-out," Farano said. Users will get a better product from the resulting competition, he added.

The fourth speaker, Art Gravina, president of Cybek Corp., noted that although minicomputer hardware is far advanced, software for the machines is back in the 1960 to 1965 era. And "hardware without software is useless," Gravina said.

Megatek Turnkey Includes DG Nova

SAN DIEGO, Calif. — Megatek Corp.'s 5000 series is a turnkey graphics system based on Data General Corp. Nova equipment.

The system, which includes a graphics display and Nova minicomputer, has 12-bit screen resolution, a 21-in. monitor, hardware blink and translation, dashed lines and sharp constant intensity vectors, the firm said.

The Nova 3 is expandable to 128K words, comes with an upper- and lower-case keyboard with 20 function keys and features a desk that is used as an operator's work station.

The heart of the system is a microprocessor-based graphic display unit. Called the MG552, it occupies two slots in the Nova and provides graphic conversions, control and display functions.

A basic system with 8K words of semiconductor memory, graphics processor, keyboard, 21-in. electronic monitor, graphics software and desk costs $20,500, a spokesman said from 1055 Shafter St., San Diego, Calif. 92106.

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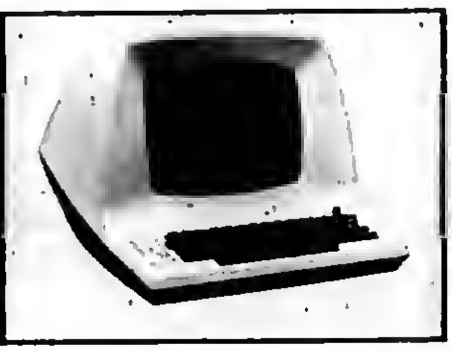

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CI Notes

Itel, Hitachi Cooperate On Large-Scale Systems

SAN FRANCISCO — Itel Corp. and Hitachi Ltd. have announced a joint development of large-scale computer systems.

"The companies have been working together for several years to combine the advanced computer technology and manufacturing skills of Hitachi with the extensive marketing, development and field service capabilities of Itel's Data Products Groups," according to John H. Clark, Itel's DPG executive vice-president.

Under the terms of the agreement, Itel will market and maintain the systems in the U.S., Canada, Western Europe, South America and Australia.

It is expected that the new computer systems, an extension of Itel's Advanced System family of computers, will play a vital role in the long-range strategy of penetrating the worldwide computer base.

STC, Memorex End Talks

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and Memorex Corp. have terminated preliminary talks relating to a posible merger [CW, July 4].

Under terms of the Memorex offer, STC would have been merged into Memorex on the basis of .725 shares of Memorex common stock for each share of STC common:

"After giving careful consideration to all the terms and conditions, the Board of Directors of Storage Technology concluded that proceeding further with the merger discussions would not be in the best interests of [the company] and its shareholders," according to Jesse I. Aweida, STC chairman and chief executive officer.

Microdata Proposes Upgrade

IRVINE, Calif. — Microdata Corp. has announced its intention to supply a software-compatible upgrade path from its Reality small business system.

No prices or configurations were announced for the small business system — dubbed Reality Royale — which is expected to have four family members and accommodate up to 128K bytes of memory and 600M bytes of disk.

The system is said to have some of the operating system in programmable read-only memory to increase throughput.

All members of the family from smallest to largest, should be compatible.

Private Sector Emphasis

DOD Draft Stresses Competitive Bids

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — The Department of Defense (DOD) has prepared a draft updating its policies and guidelines for the acquisition of automatic data processing (ADP) equipment. A final directive is expected to be released in September, a spokesman said.

The draft stressed competitive bidding and increased reliance on the private sector for software and services.

Draft 7905.2, entitled "Acquisition of Automatic Data Processing Equipment, Software and Services," emphasized reliance on a vendor's standard executive software wherever possible.

DOD components should not modify such software themselves solely to improve ADP equipment processing time performance, but should contract with a commercial vendor to develop and maintain DOD-required modifications whenever a significant economic benefit over the life cycle of the system can be documented, according to the draft.

Only in three circumstances can DOD components perform in-house modifications of vendor standard executive software, the instruction said.

The first two exceptions are when mission requirements preclude waiting to have an obvious flaw or error corrected and when the vendor does not agree to develop and maintain a modification which is dictated solely by the need to safeguard DOD information.

The third exception is when the senior ADP policy official determines that modifications, under conditions not specified above, can be accomplished more effectively and efficiently in-house.

Focus on Standardization

The draft also focuses on standardization, and indicates Federal Information Processing Standards (Fips), other than those dealing with standard data elements and representations, shall be specified for mandatory use in procurement documents of software, services and equipment unless a waiver is obtained from the Office of the Assistant Secretary of Defense (Comptroller).

"All contracts for data systems development, maintenance or operations services shall specify the use of DOD standard data elements and codes to the extent they are available and applicable," the draft stated.

Methods of procuring ADP equipment, software and services were ranked in order of preference: functional systems requirements; equipment performance requirements; and a combination of these two, by specified make and model or by sole source.

Some portions of the draft will undergo changes following the recent receipt of comments from various agencies, a spokesman said. Among these are the point at which a single selection office will handle selection of equipment or services to be procured and the threshold level at which a delegation of procurement authority is needed, he added.

The original draft said each military department should establish and maintain a single selection office to develop solicitation documents and evaluate and recommend vendors' proposals.

This single office will handle selection when the value of the equipment or services to be procured is equal to or greater than $250,000, or if a dispersed system is to be centrally designed, programmed and maintained, the draft stated.

Where multiple vendors are involved, the DOD components "shall consider limiting the number of vendors to a practicable maximum of three" per system or installation, according to the draft.

Contracts should identify appropriate tests to validate the system's capability to meet performance requirements.

Value engineering incentive clauses should be used in solicitation documents and contracts in efforts to reduce costs and minimize technological obsolescence, the report indicated.

"Sharing of ADP resources and reutilization of ADP equipment shall be considered as the leading means for satisfying ADP resource requirements," it said.

IBM Trial Testimony Reveals CDC's Expectations, Plans

By Edith Holmes
Of the CW Staff

NEW YORK — Control Data Corp.'s peripheral systems probably won't do as well as the company forecasted they would during 1977, but the OEM business will do better than expected, according to Gordon Brown, CDC vice-president of marketing and planning.

Appearing as a witness here recently on behalf of the U.S. government in the trial of its antitrust suit against IBM, Brown discussed the anticipated percentage growths of various aspects of CDC's peripherals enterprises between now and 1980. He relied primarily on a document which CDC understandably wanted kept confidential — the latest draft of its current long-range plan.

Under that plan, CDC expects to grow in all areas of its peripherals business, Brown stated. Beginning with the OEM area, the CDC vice-president indicated his firm anticipates revenues to increase at a rate of 15% a year.

At one time, CDC had predicted OEM revenues would grow at a rate of 18% between now and 1980; however, this rate was considered too aggressive for "sound long-range planning," Brown said. He had personally recommended a 12% growth rate in the OEM area.

The OEM business is more sensitive to slowdowns in the economy as a whole, Brown told the court. CDC's expectation of two more recessions over the next five years accounts for its conservative revenue growth expectations for this area.

On the other hand, in times of economic recession or depression, users are more likely to invest in peripheral equipment in hopes of improving the overall performance of their computer systems, he said.

This is part of the reasoning behind CDC's expectation that its peripheral systems business, which includes IBM plug-compatible peripherals, will increase 22% each year in revenues for the next few years.

The corporation's business products area is expected to grow 10% in revenues annually through 1980, according to the draft plan.

Producing forms, a full range of disk products and computer room supplies, the business products business is a "cash cow," a business that generally has a positive cash flow, Brown stated.

Finally, the CDC executive noted that the data systems area of the peripherals business is projected to increase between 9% and 10% per year in revenues.

Much of the OEM business is free of the risks associated with the IBM plug-

(Continued on Page 39)

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Pansophic Marks Its Eighth Year With Record Sales

OAK BROOK, Ill. — On April 29, Joseph A. Piscopo cut the first slice of a giant birthday cake — a confection celebrating the eighth anniversary of Pansophic Systems, Inc.

Piscopo, president of the firm, founded it in 1969. Before the first year was over, its first software product had been written and by 1970 it was being vigorously marketed. That product, called Panvalet, has become a standard in program management, security and control, he said.

When Pansophic was formed — just prior to IBM's now-famous decision to "unhundle" and separately price its computer software and services from its computer hardware — it was initially engaged in consulting services, systems design and programming for firms in the Midwest. It had three computer software specialists and a small office just west of Chicago.

A great number of new firms appeared starting in 1969, since IBM's decision to unbundle provided the opportunity and the impetus for the emergence of a new subindustry of independent software suppliers.

The capital requirements were minimal. There was a vast opportunity available for the development of generalized computer software products which could be readily marketed to over 20,000 IBM computer users around the world.

The software industry has been volatile in the last eight years. Of the more than 700 software companies formed in 1969, only a handful are in business today, and only two are profitable, Piscopo said, noting Pansophic is one of the more profitable ones.

Sales Figures

"Pansophic reported a record $7.2 million in sales for the fiscal year ending April 30, 1977. This represents nearly a 45% increase over the previous fiscal period ending Apri 30, 1976," Piscopo said.

"Earnings for 1977 were 690% greater than for 1976. The major source of this increase was international sales, which increased approximately 80% over last year's figures.

"For the sixth year in a row, Pansophic paid $50,000 in dividends to shareholders," he added.

"We look for some reduction in overall processing costs resulting from hardware technology advance, coupled with a continued strong increase in user acceptance of packaged software," Piscopo continued.

"The software industry is maturing to the point where an ongoing research and devlopment effort will be sustained. We expect an explosion of innovative technological developments to occur over the next four to 10 years, particularly in systems software," he said.

Piscopo feels users can expect more variety of product offerings, improved reliability and flexibility, high performance and operating efficiency.

"Independent suppliers," he said, "will provide even more effective training, better documentation, and more capable product services and local support personnel to serve their users and support their products. Extended capabilities of improved features will be included in design consideration for future products."

Widely Used

Marketing of Panvalet in the U.S. began early in 1970 and expanded to worldwide markets in 1971. Today Panvalet is one of the most widely used software products ever developed.

In fact, at the recent international Computer Programs, Inc. (ICP) Million Dollar Awards in Chicago, Panvalet received awards for having sales over $10 million and having over 3,000 customers.

Pansophic acquired exlusive marketing rights in May 1973 to another product, Easytrieve, an information retrieval and file management system. Easytrieve has also been highly successful and received ICP awards for having sales totaling over $5 million and over 1,000 installations.

Pansophic has also developed Pan*Da, a disk analysis and data set management system providing large computer users with an effective tool for efficient management of magnetic disk storage devices. Total Pan*Da revenues to date exceed $200,000, with 200 installations.

Throughout its history, Pansophic has dedicated itself to market only software products of the greatest benefit to users and with high standards of technical excellence and reliability, Piscopo said.

The company has made a total commitment to support the needs of users through a high-caliber customer service staff, he indicated.

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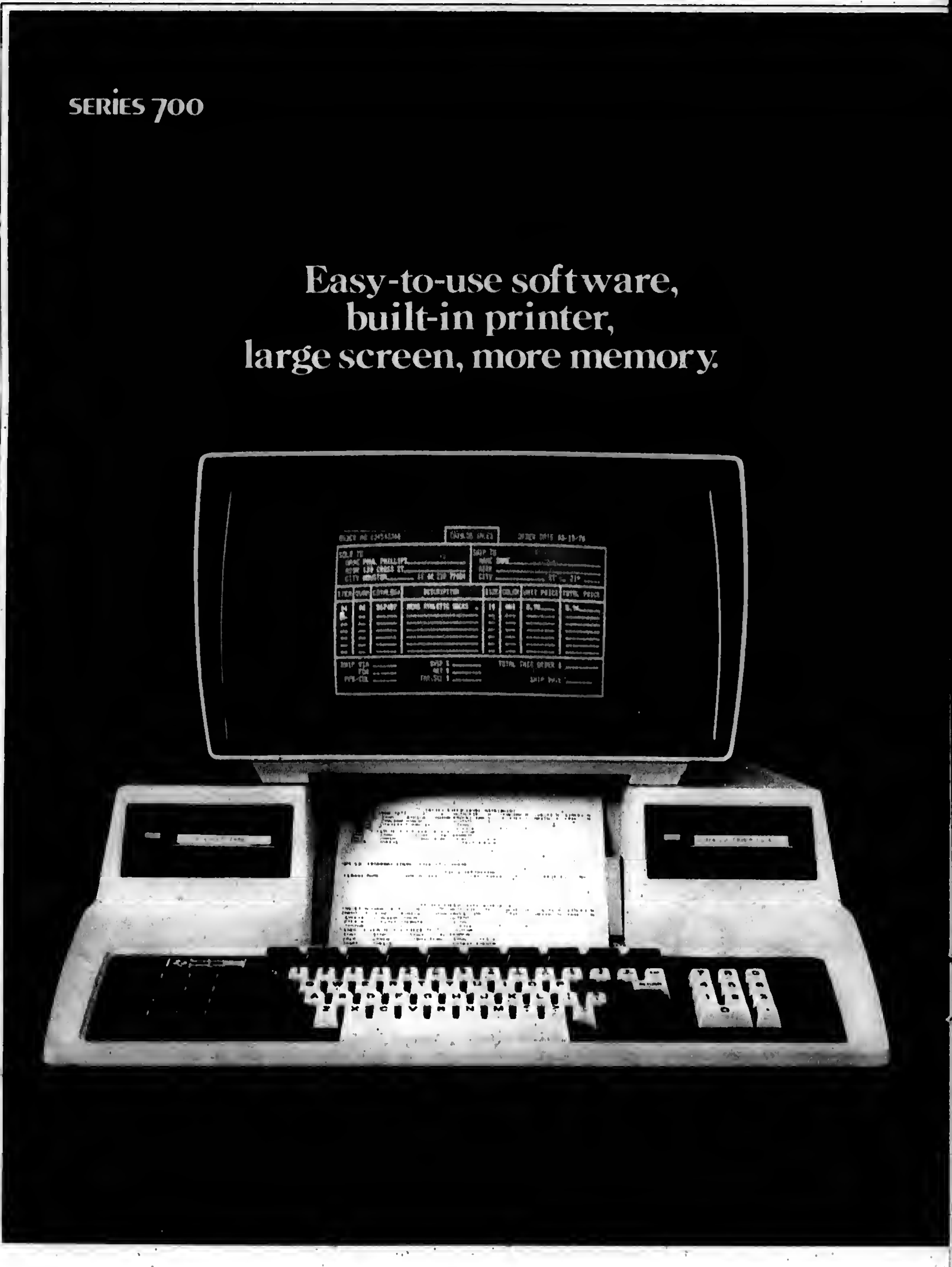

With Coming of National Health Insurance

DP's Share of Health Insurance Dollars Seen Growing

By Toni Wiseman
Of the CW Staff

MENLO PARK, Calif. — Health is the third largest industry in the U.S., with 1976 expenditures of $140 billion and an additional $43 billion in federal expenditures, or 11.4% of the entire federal budget.

The data processing share of administrative costs ranges between 15% and 30%, yielding a commercial market for Medicare, Medicaid and Champus (a military payment system) of $292 million. Another $100 million is being spent in-house by the states and an additional $20 million goes for other expenses, according to a recent report by Input, Inc., a market research firm here.

This $412 million for fiscal 1976 does not include amounts spent by the federal government internally for DP, it added.

The report noted that the advent of National Health Insurance (NHI) could raise the federal expenditure forecast for 1980 by as much as 131%.

The Medicare, Medicaid and Champus programs are generally managed hy fiscal intermediaries, carriers and contractors, who subcontract DP activities to commercial vendors, Input said, citing California as an example. Maryland, it said, is an example of a contractor which does its own DP.

"The Blue Cross/Bluc Shield plans are the largest contractors, and Electronic Data Systems (EDS) is the largest DP subcontractor, with approximately $70 million in related revenues in 1976," the report stated.

The State of California, one of the largest beneficiaries of all three programs, contracts its $2.4 billion Medi-Cal program to a consortium of Blue Cross and Blue Shield plans in the state, the report said. The administrative portion of the contract is $43 million, of which EDS receives $13 million for DP and Blue Cross and Blue Shield retain $1.5 million for DP.

"The advent of NHI will cause considerable tremors through the existing Medicare and Medicaid systems and will result in DP expenditures in 1980 ranging between $667 million and $1.2 billion, depending on which NHI program is implemented," Input noted.

The report said the magnitude of the DP requirements for NHI are so great they will influence the way the NHI program is administered.

Processing Estimates

"System processing estimates carried out by one processing vendor currently operating under Medicare and Medicaid shows that an ultimate NHI would dwarf the size of the current Social Security processing resources, which themselves are among the largest in the country.

"NHI will create more DP dollar expenditures, greater standardization of functions, increasingly centralized control of decision-making and, because of the magnitude of even the smallest NHI proposal, will create a great demand for vendors with related capabilities and experience," Input stated.

Contracts will go to those vendors who are experienced in health insurance-related work, with an emphasis on turnkey experience, i.e., "the ability to provide the software and services related both to DP and to the allied administrative paperwork," the firm noted.

"Barriers to market entry, which can often be erected through proprietary software, will be less of a factor in the NHI environment for the first couple of years. This is because of the uncertainty, at this time, of the exact characteristics of the final legislation.

"HEW is most likely to take a model system approach with NHI. This method requires vendors who wish to obtain processing contracts to use software that conforms closely to the federal standards," Input said.

"One way for vendors to gain an early entry into the NHI world would be to participate in development of that model software," the report suggested.

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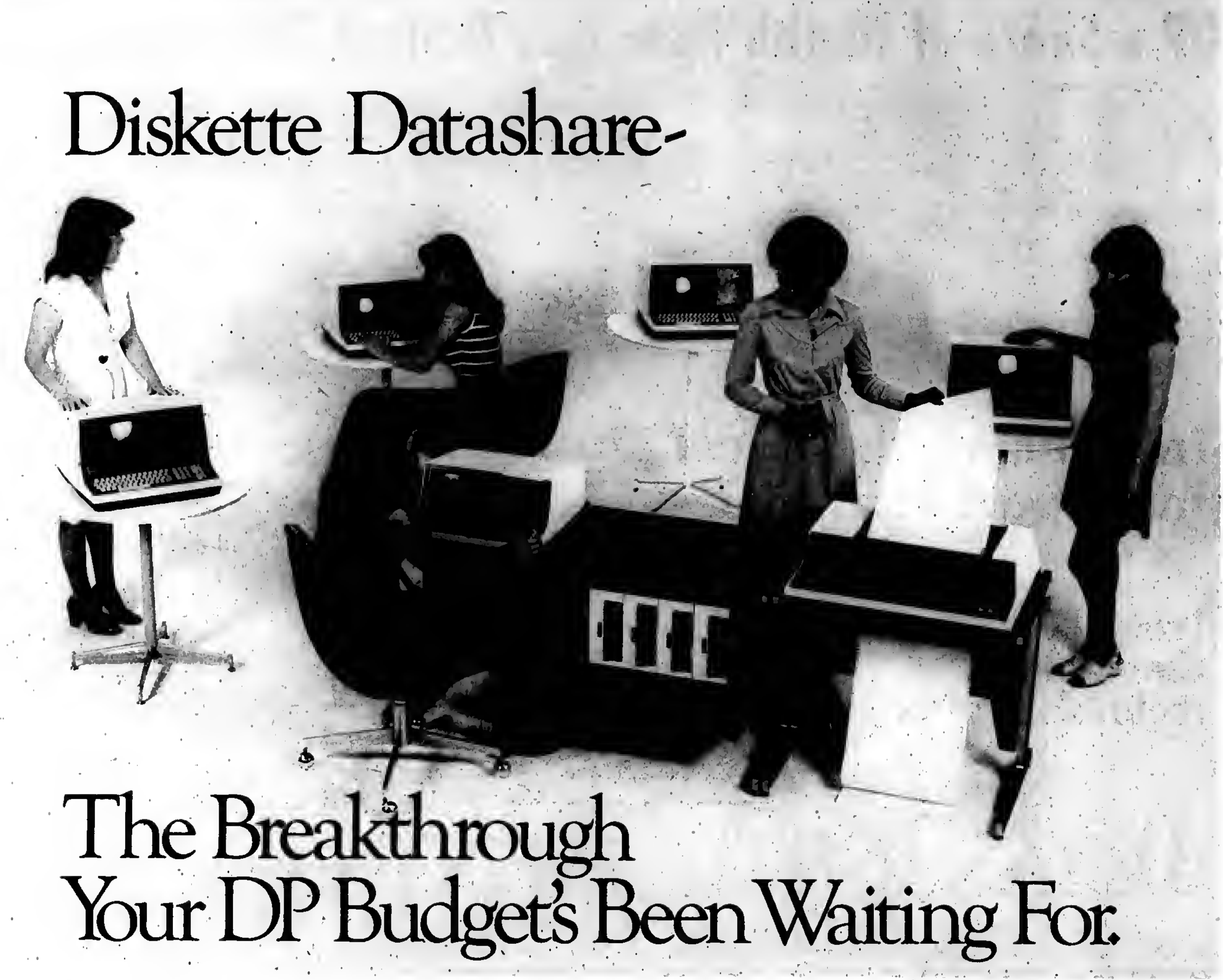

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CDC Continuing R&D on Mass Storage System

By Edith Holmes
Of the CW Staff

NEW YORK — Between $15 million and $20 million has already been spent by Control Data Corp. on its CDC 38500 mass storage system, and the research and development expenditures are continuing, according to Gordon Brown, CDC's vice-president for marketing and planning.

CDC expects mass storage systems to become commonplace and so plans to put the 38500 out through a series of product offerings over the next several years, Brown said here recently during his testimony as a U.S. government witness in the trial of the antitrust case against IBM.

The CDC executive described his corporation's plans in this area broadly — as a "hierarchy of products" with interrelationships and interdependence.

CDC expects its mass storage systems to satisfy three kinds of users: those with IBM systems, those with CDC systems and those who occupy the OEM marketplace.

The $15 million to $20 million to which Brown referred has been expended only to develop products related to the total 38500 configuration.

Brown estimated that the basic technology work done by CDC in the mass storage area cost between $3 million and $4 million. Research and development on Vdam — the software required by the system and consisting of staging packages designed to be used with a variety of mainframes — has eaten up approximately $6 million.

Some $7 million has gone into the creation of the 38500 hardware — the selector, cartridges and mass storage adapter, Brown said.

Another $2 million has been spent on enhancements to the CDC system, which currently has two users, and on follow-on versions of the mass storage device, he stated.

Much of the R&D cost for the system has been allocated to a CDC subsidiary, Computer Peripherals, Inc., which was formed in April 1972. As of October 1975, when his deposition in U.S. vs. IBM was taken, Brown said about $8 million of these costs had been deducted directly from CDC's accounts.

Unlike the creation of its disk products, CDC began development of the 38500 three years before IBM announced its product in this area in October 1974.

During the basic R&D period for the 38500 — between the middle of 1972 and late 1974 — CDC spent approximately $10 million on the system. In 1975, another $4 million was spent, and a similar amount was expended in 1976 on this project, Brown said.

CDC had its first 38500 user by September 1976, but the product has caught on slowly.

"Our expectations were that the IBM systems user would accept the mass storage concept earlier than he did," Brown said.

In addition, CDC expected to sell more mass storage devices in 1976 than it did, thus falling short of sales quotas for the 38500 last year.

Other peripherals sales made up for this short fall, causing CDC's overall market objective in the area for 1976 to be exceeded by 10%, he stated.

CDC's mass storage system incorporates technology significantly different from that employed by IBM's 3850 mass storage product, Brown indicated. There was some feeling in CDC that if IBM engineered its storage device one way, CDC should too — given the resources IBM can bring to bear on such projects.

Brown said he continues to believe, however, that the CDC line head recording technique is superior to anything IBM has developed in the mass storage area.

Survey Directory

FAIRFIELD, N.J. — Over 1,500 multiclient reports and syndicated services available from consulting firms are listed in the second edition of the *Directory of U.S. and Canadian Marketing Surveys and Services.*

The directory includes 125 consulting firms and both industrial and consumer marketing research companies as well as media research firms. The companies range in size from such international firms as IBM, A.D. Little, A.C. Nielsen and Stanford Research Institute to a number of one-man operations.

The directory lists about 50 surveys, including general market studies on computers and DP and such special reviews as computers in insurance, medicine and process industries; and minicomputers.

The directory is priced at $100 from C.H. Kline & Co., 330 Passaic Ave., Fairfield, N.J. 07006.

Testimony Reveals CDC's Plans

(Continued from Page 35)

compatible peripherals business, Brown said.

In the plug-compatible area, however, he said CDC's general plan is to "capitalize on any substitute business opportunities available."

Smaller Revenue Base

Greater growth can also be projected for peripheral systems because they comprise a smaller revenue base — $75 million compared with CDC's OEM revenue base in excess of $150 million, Brown added.

Continuing his explanation of the principle that it's easier to achieve more dramatic gains in small revenue base areas, Brown cited the small dollar values presently generated by the IPL Omega 480-1 and Omega 480-2 systems and by CDC's 38500 mass storage system. With virtually no dollars associated with either of these programs, CDC can expect a compound growth rate of approximately 30%.

In other words, he explained, you don't have to sell many peripherals systems which include the Omega and mass storage devices to reach a 20% growth rate of the $75 million revenue base; you just have to sell 36 or 40 of these systems each year, he suggested.

IBM does impact CDC's short- and long-term planning, Brown told the court. It is critical to CDC to evaluate where its products stand in relation to those of IBM, he stated.

The CDC vice-president identified three kinds of risks: marketing risks, or 'Can we sell the product we produce?'; technology risks, or "our own ability to complete all phases of research, development, manufacturing and start up costs"; and business risks.

Business risks are perhaps "the most critical" to the plug-compatible business, he said. These risks can include unforeseen product announcements, price cuts and the potential for subsystems to be rendered inoperable and/or incompatible by IBM actions in microcode encryption techniques.

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Medicine Seen Healthy Market for Peripherals

LOS ANGELES — As far as the computer industry is concerned, the prognosis for the medical equipment market is excellent, in one executive's opinion.

"The marriage of computer technology and medical science has really revolutionized health care in the United States," according to Ralph Gabai, division vice-president and general manager of the Pertec Division of Pertec Computer Corp.

Computerized office systems that allow doctors to have better access to their records, faster turnaround time on patient's bills and generally greater office efficiency is fast becoming commonplace, he noted.

"These are simply routine office functions," Gabai stated. "What is really exciting are the increasing number of applications that would have been impossible to achieve without a computer."

As an example, he cited Dr. Lewis C. Cook, an opthalmologist from Texarkana, Texas, who is developing a software package that will include data on patients' allergies to all medication related to eye surgery and eye diseases.

Using Tex-E-Comp's SBC, the basic system, called a 2050, includes a 16-bit CPU with up to one million bytes of directly accessible core; a 10M-byte Pertec D3000 disk drive, 5M bytes fixed and 5M bytes removable; a 120 char./line, 9x7 matrix impact printer with a capability of 60-150 line/min; and a 24-line, 80 char./line video display terminal.

Medical Office Tasks

In addition to this unique application the system handles all routine medical office tasks such as processing patient information, on-line posting of individual transactions and turnaround billing receipts, transaction history and daily proof reports. It also handles past due reports, invoicing, monthly billing statements and standard forms for Medicare, hospitals and the American Medical Association.

"Equally exciting in terms of unusual applications is the use of computers in connection with the rapidly growing medical diagnostic techniques called computerized tomography that reconstruct images of the inside of the body," Gabai stated.

Exotic applications aside, Gabai feels that the relationship between medicine and DP will be meaningful for all concerned — especially computer peripheral equipment manufacturers.

"Hospital administrators realize that the help of the computer industry will be essential to cut health care costs, expedite communications, tighten up financial systems and generally improve admissions procedures.

"Anyway you look at it, whether it's routine office functions or more esoteric applications like CT scanning, computer peripheral equipment will continue to have a very healthy marketplace in medicine because of the increased use of CRTs and terminals by hospitals," Gabai concluded.

Executive Corner

- The Burroughs Corp. board of directors has elected James C. Fletcher and Arthur R. Seder Jr. to the board and has also elected James A. McCullough executive vice-president, business machines group and J. Paul Leebrick Jr. a Burroughs vice-president.
- Richard J. Egan has been elected to Cambridge Memories, Inc.'s board of directors.
- John C. Lobb has been elected to the board of directors of Modular Computer Systems, Inc. (Modcomp).
- Glenn E. Penisten was elected chairman of the board and president of American Microsystems, Inc.
- William L. Miron, past corporate executive vice-president, director and member of the Office of Chief Executive for Bendix Corp., has accepted a seat on the Process Computer Systems, Inc. (PCS) board of directors.
- Dr. Lawrence M. Parks has been elected president of Commercial On-Line Systems Corp.
- Zach Lonstein has been elected president and chief operating officer of Transportation Computing Sciences Corp.
- Joseph L. Dionne has been named president of McGraw-Hill Information Systems Co., a division of McGraw-Hill, Inc.
- Robert D. Enochs has been named to head the new division for computer-output microfilm products as part of Bell & Howell Co.'s microimagery group.
- Gerard R. Gaudet has been named Dataproducts Inc.'s vice-president of operations for Sunnyvale, Calif. and Hong Kong.
- Sol Zasloff has been appointed vice-president of marketing for Micropolis Corp.
- H. Richard Seltzer was elected vice-president of ITT Domestic Transmission Systems, Inc., a subsidiary of International Telephone & Telegraph Corp.
- Joseph F. Bradley has been appointed vice-president, marketing, components division of Burndy Corp.

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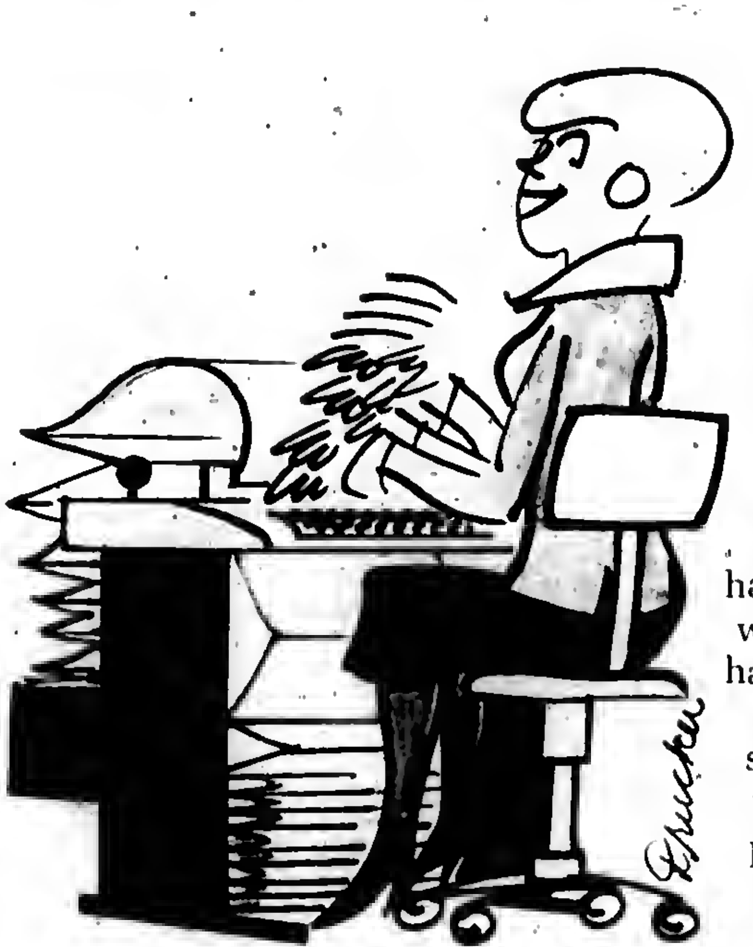

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Dr. DeForest L. Trautman
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Expressions of interest should be forwarded to:

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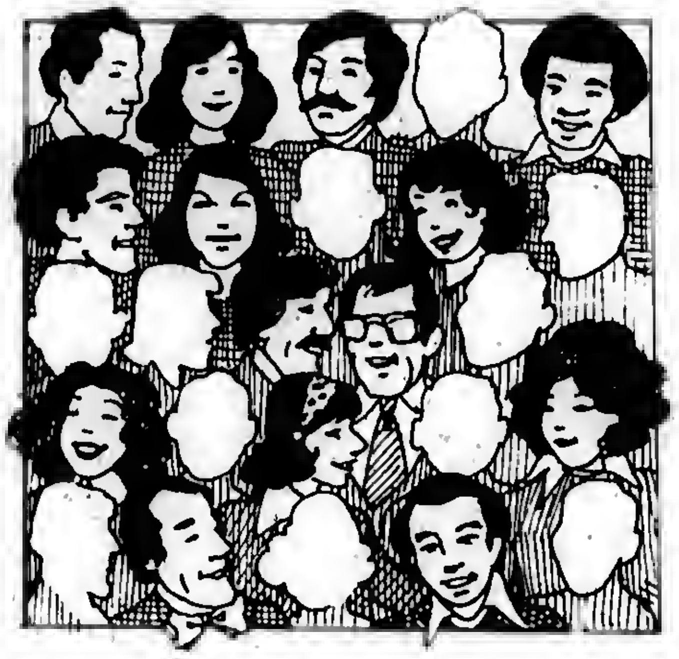

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To apply for a position in any of the above locations call Charley Polachi at (800) 225-7346 or send him your business card with your home phone number on it to Data General Corporation, 15 Turnpike Rd., Westboro, MA 01581.

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Teacher

Electronic Data Processing

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Mr. Glenn Weeks, Personnel Manager, Waupun State Prison, Waupun, WI 53963—(414) 324-5571. Applications or resumes must be received by July 29th, 1977. An Equal Opportunity Employer functioning under an Affirmative Action Plan.

EDP POSITIONS

The Computer Systems Division of Harris Corporation has expansion positions available in our Ft. Lauderdale, Florida, location. These positions are growth oriented and center around the manufacture, development and sale of our medium-scale digital computer system:

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A senior marketing position to direct market penetration and product development of primary Harris Computer Systems Division product lines and related systems. Previous hardware sales experience and plannning relative to marketing systems are required.

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Must have a minimum of 3-5 years' experience in the data processing community with emphasis upon public relations, technical EDP communications (both written and verbal, planning, researching and preparing press oriented programs. Additional responsibilities will include preparation of application briefs and bulletins plus technical articles for presentation. A degree in Journalism or English is preferred.

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Must have a bachelor's degree. In addition, we prefer a candidate with 3-5 years' experience in the electronic manufacturing field. Experience should also include the analysis and programming of placement, routing and evaluation of inter-connection design problems.

DIAGNOSTIC ENGINEERS

A minimum of 2 years' experience required in hardware evaluation, design, coding, debugging, documentation and release of faulty detection and isolation software. BSEE or computer sciences.

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DATA PROCESSING POSITIONS

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SYSTEMS AND PROGRAMMING MANAGER

Challenging position involves development of on-line microfiche and personnel systems. Must have at least six years solid Data Processing experience and at least two years in significant management positions. Experience with large-scale IBM Teleprocessing systems required.

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Challenging position involves operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience and at least two years in significant management positions, mainly with large-scale IBM Teleprocessing systems.

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Position involves maintenance of an innovative IBM 370 Teleprocessing system with microfiche terminals. At least three years in-depth experience maintaining both IBM DOS and OS Teleprocessing systems required, preferably CICS with 3270 terminals. Must be able to maintain system single handedly.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round trip air fares to place of residence. Free furnished housing and free education for children — two or more years contracts. Send resume and salary history to.

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Attn: Joe Papa, Director

UNIVERSITY OF PETROLEUM AND MINERALS
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Applications are invited for professorial positions (all ranks) open for the Academic Year 1978-79, starting 1 September 1978, at the University of Petroleum and Minerals, Dhahran, Saudi Arabia, in Business and Industrial Administration (Undergraduate and MBA) including the following fields:

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Apply with complete resume on academic and professional background, list of references, a complete list of publications with clear indication of those papers published in refereed professional magazines/journals with research details, and with copies of degrees including personal data such as, family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

University of Petroleum
and Minerals
c/o Saudi Arabian Educational Mission
2223 West Loop South, Suite 400
Houston, Texas 77027

DIRECTOR OF SYSTEMS AND RESEARCH

An immediate position is available for a Director of Systems and Research.

This position is responsible for managing all academic administrative computing for the University, including records and registration, financial aid, admissions and alumni affairs. In addition, this position acts as a staff position to the central administration with respect to providing information and research for management decisions.

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All of our P/A positions require at least 2 years experience with O/S COBOL. Familiarity with assembler, JCL and utilities. Effective oral and written communications skills. A BA or BS degree or equivalent experience. Specific openings exist in:

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Requires heavy experience in O/S COBOL, JCL and utilities. Will be involved in developing and implementing new approaches to Health Management Systems. Requires knowledge of Utilization Review Processing and/or PSRO's plus demonstrated ability to interface with clients in the Health, Medical or Insurance Industries. Statistical experience desired.

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*MICS is a mark of Optimum Systems Incorporated denoting a computer software proprietary to Optimum Systems Incorporated.

Salaries are commensurate with experience and ability. OSI provides an excellent employee benefits program, and we invite you to accept our challenge. Please contact the Personnel Department, 2775 Northwestern Parkway, Santa Clara, California 95051. (408) 987-4444.

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The Association of American Medical Colleges is seeking an individual to assit Director in overall direction of computer services including planning and budgeting, supervising staff, and developing and implementing standards and procedures. Candidates must possess several years experience in a computer service center with a record of increasing management responsibility and strong technical experience in application systems development with COBOL as a major language. Fortran, SPSS and Data Base experience desirable. Salary mid to upper twenties range. Please send resume to ASMC, Attn: Business Office, One Dupont Circle, N.W., Washington, D.C. 20036. AEO/AAE.

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Let us know who you are, where you are and where you want to go. Our business is evaluating your career and determining your career pattern. Business application programmers, programmer/analysts are much sought after by our client companies (the largest state-of-the-art installations). Where do you fit in this booming marketplace? We'll tell you, that's our job! If you're the best at what you do, fill out and mail this coupon to us. Because we're the best at what we do! For immediate assistance call in Boston (617) 423-1900 or in Houston (713) 960-0350.

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UNIVERSITY OF PETROLEUM AND MINERALS DHAHRAN, SAUDI ARABIA

The Department of Systems Engineering, University of Petroleum and Minerals, Dhahran, Saudi Arabia, will have faculty positions open for the Academic Year 1978-79, starting 1 September 1978. Candidates with PhD degrees preferably with teaching experience are invited to submit their applications. English used for instruction.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten month duty each year with two months vacation paid and possibility of participation in University's ongoing Summer programs with adeaute additional compensation.

Apply with complete resume on academic and professional background, list of references, a complete list of publications with clear indication of those papers published in refereed professional magazines/journals with research details, and with copies of degrees including personal data such as, family status (wife's maiden name, names of childen, age and sex) home and office addresses, telephone numbers to:

University of Petroleum and Minerals
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Minimum 2 years VM/370 or IMS experience required.

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You will be involved in the programming and analysis of an online integratad studant record system.

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Waltham, MA 02154
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Your responsibilities will include the development of support manuels, the writing of operetion, application and diagnostic for the Hardware and the writing of description end epplicetion of the associated software. The candidate must elso be able to specify ell art needed to support the written material.

We offer a good statting salery and complate benefit package. If you have the ebove quelifications end desire e chellanging position in software writing, pleese send resume in confidence to:

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Paid interview and relocation expenses. Send resume and salary requirements to:

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Dr. John M. Tyler, Director
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DIRECTOR, SYSTEMS DEVELOPMENT

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SALARY: $15,100-$22,650 plus liberal employee benefits. Starting salary dependent upon experience and qualifications. Interested persons should submit resume by August 24, 1977 to: Marc M. Solomon, Oberlin College, Computing Center, Oberlin, Ohio, 44074. This position is to be filled by October 14, 1977 with the person reporting to work no later than November 14, 1977. *Affirmative Action (M/F) Equal Opportunity Employer.*

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Ferris State College, enrollment 9900 students, is seeking a Director of tha Computer Center. THe College has an IBM 370/145, operating under DOS/VS, in a data base/data communications environment. The primary responsibilities of the Director are to administer the use of the computer facility; and to provide leadership and direction in the identification, development and implementation of new systems within the College. The Computer Center is committed heavily to supplying suppert services both te administration and instruction.

Candidates sheuld have demonstrated significant technical competence and management ability. Experience in academic institutions is desirable. Skill in communication, both oral and written, is essential. Salary is competitive and dependent upon educational background and experience.

Applications should be received not later than July 30, 1977. Please send letter, resume, and names of three references to: Michael W. Gattle, Assistant Vice President for Budgets and Planning, Ferris State College, Big Rapids, Michigan 49307 (616) 796-9971. Affirmative Action/Equal Opportunity Employer.

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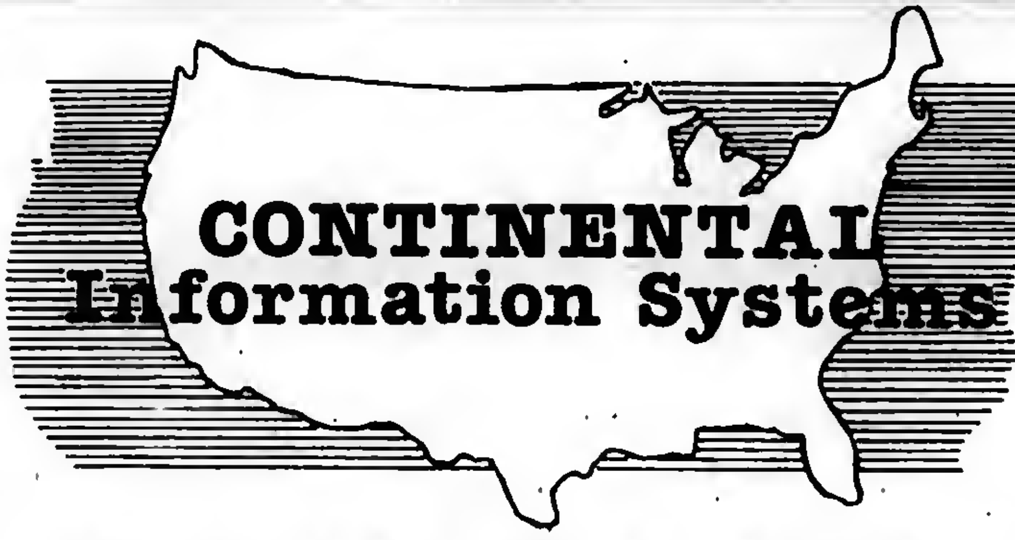

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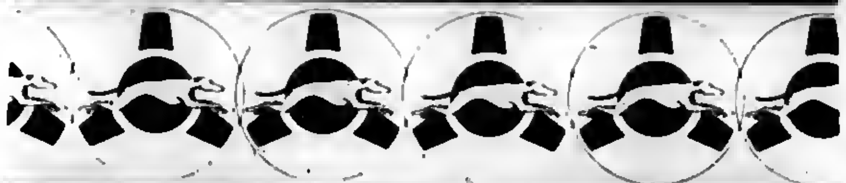

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Each bid shall be mada upon the basis that each, every and all of the items hereinabove dascribed is bid for on the basis of an "as is" transaction. Bidders are instructed 1o inspact 1ha parsonal property and each of the items hereinabove se1 forth during regular business hours and so as not to interfere with the services, 1reatment and/or operations of the Hospital of the LOS MEOANOS CDMMUNITY HOSPITAL DISTRICT at the premises of tha LOS MEOANDS COMMUNITY HOSPITAL DISTRICT located at 550 School Streat, city of Pittsburg, County of Contra Costa, State of California 64565.

Each bid shall be for the complete computer system or as to specific items of said personal property, preference and priority being given to bids which shall be for the complete unit ra1her than for component parts.

Every bid shall be submitted only on the standard bid form available at the office of the Administrator of the LOS MEOANOS COMMUNITY HDSPITAL OISTRICT, 550 School Street, Pittsburgh, CA 94565.

Bids will be received by the LOS MEOANOS CDMMUNITY HOSPITAL OISTRICT until 5:00 o'clock o.m. on the 27 day of JULY 1977, at the office of the Administrator of 1he LOS MEDANOS COMMUNITY HOSPITAL DISTRICT.

Bids will be opaned and publicly raad aloud at or about 8:00 o'clock p.m. on the 27 day of JULY, 1977, in the Conference Room of the LDS MEDANOS COMMUNITY HOSPITAL DISTRICT.

Each bid shall be accompanlad by cash, or a cashier's check, or a certified check, or bid bond of a surety company licensed to do business in the State of California, in the amount of at least ten parcant (10%) of the amount bid, made payable to the order of the Board of Directors of the LOS MEOANDS CDMMUNITY HOSPITAL OISTRICT, and shall ba saaled and filed with the Administrator of the LOS MEDANOS COMMUNITY HOSPITAL OISTRICT.

Tha above-mentioned cash, checks or bid bonds shall be givan as a guaranty that the biddar will pay the balance of the amount of his bid if awarded to him, and will ba declared forfeited if the successful bidder refuses to accept dalivery of the personal property for which he has bid.

The successful bidder shall be responsibla for any cartage, fraigh1, haul away, or other charges, and the delivery shall be made to the successful bidder at the LOS MEOANDS CDMMUNITY HOSPITAL OISTRICT Hospital.

The Board of Oirectors of the LOS MEOANOS COMMUNITY HOSPITAL DISTRICT reservas the right to reject any and all bids and/or waive any irragularity or informality in the bids or in the bidding.

No bidder may withdraw his bid for a period of thirty (30) days after the date set for the opaning thareof.

This is not an official publication. Refer to official notice to bidders published on July 8, 1977 and July 15, 1977 in the Pos1 Olspatch; published in Pittsburg, California.

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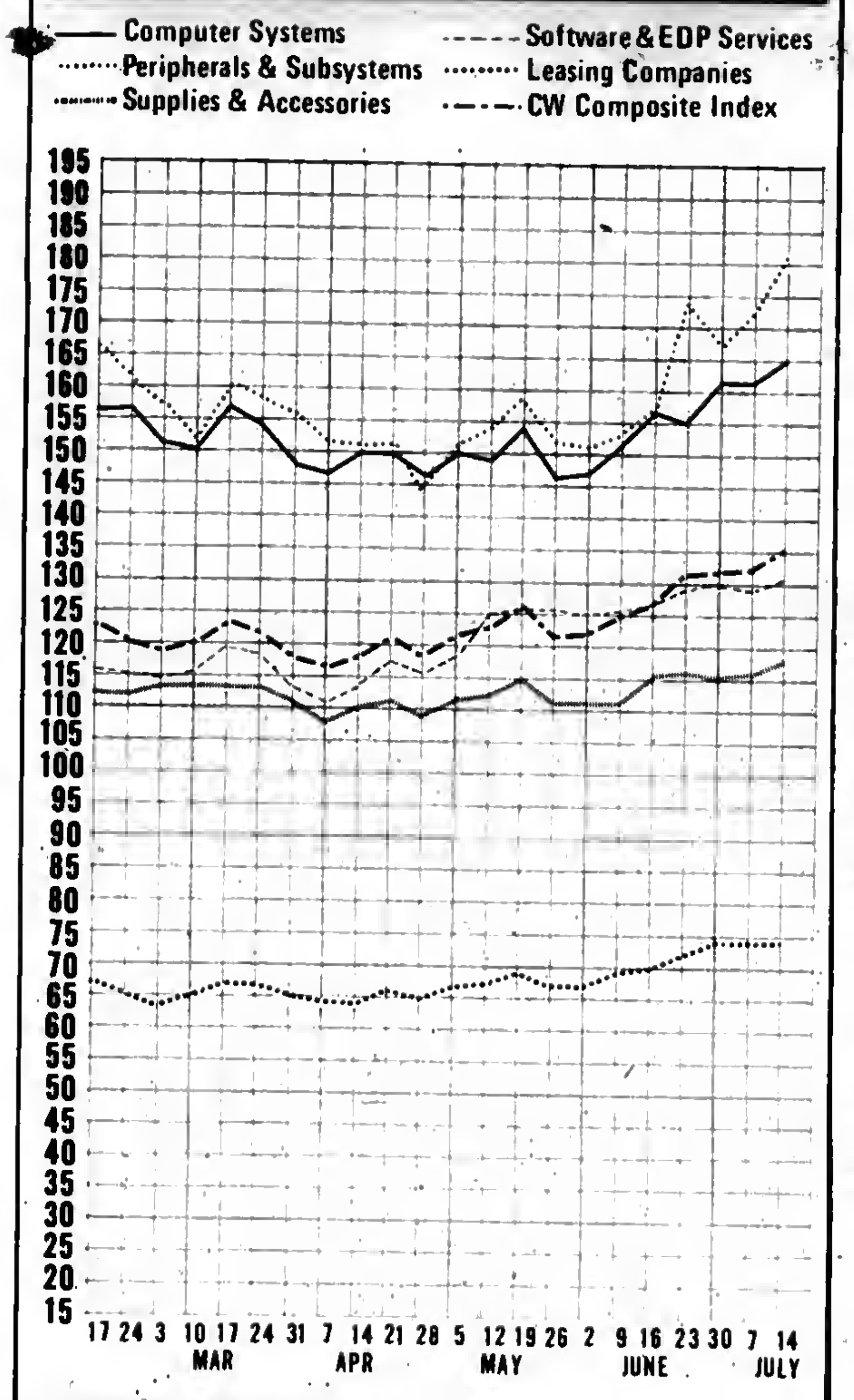

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Three Months Ended April 3

	1077	1876
Shr Ernd	$1.50	$1.16
Revenue	861,596,000	572,416,000
Earnings	23,038,000	17,900,000

INFORMATION MAGNETICS

Three Months Ended April 2

	1677	1676
Shr Ernd	$.21	$.35
Revenue	7,796,000	6,170,000
Tax Cred	.....	30,000
Earnings	399,000	485,000

KEYOATA

Three Months Ended April 30

	1077	1976
Shr Ernd	$.05	$.11
Revenue	3,667,000	3,801,000
Earnings	127,000	313,000
9 Mo Shr	.13	.29
Revenue	10,830,000	11,147,000
Earnings	346,000	794,000

MICROWAVE ASSOCIATES

Three Months Ended April 2

	1077	1676
Shr Ernd	$.65	$.53
Revenue	16,231,000	15,507,000
Earnings	990,000	776,000
6 Mo Shr	1.10	.86
Revenue	31,269,000	28,818,000
Eernings	1,866,000	1,262,000

MOHAWK OATA SCIENCES

Yser Ended April 30

	1077	1676
Shr Ernd	$.60	$1.02
Revenue	146,057,000	161,672,000
Tax Cred	1,642,000	2,037,000
Eernings	4,553,000	13,560,000
3 Mo Shr	.13	1.36
Revenue	35,146,000	41,028,000
Esrnings	1,010,000	10,178,000

NASHUA

Three Months Ended April 1

	1977	1676
Shr Ernd	$.60	$.30
Revenue	93,779,00	61,906,000
Esrnings	2,780,000	1,400,000

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Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEONESOAY, JULY 13, 1977

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Måss. 02139

COMPUTER SYSTENS

EXCH		PRICE 19TT RANGE (1)	CLOSE JUL 13 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ANOAHL CORP	0- 39	30 1/4	+4	+15.2
N	BURROUGHS CORP	55- 91	62 1/2	+1 1/8	+1.8
O	CONPUTER AUTCNATION	18- 28	26 1/2	0	0.0
N	CONTPOL OATA CORP	20- 26	21	+ 1/8	+0.5
N	OATA GENERAL CORP	35- 47	44 3/4	+ 1/2	+1.1
N	OATAPOINT CORR	18- 30	26 7/8	+1 5/8	+6.4
N	UIGITAL EQUIPNENT	3T- 53	46	+ 5/8	+1.3
N	ELECTRONIC ASSOC.	2- 3	2	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	9 1/8	+ 5/8	+7.3
O	FOUR-PNASE SYSTENS	13- 17	15 1/4	- 1/8	-0.8
N	FCRBORO	42- 54	47 3/8	-3	-5.9
O	GENERAL AUTOMATION	6- 9	7 5/8	0	0.0
U	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	NEWLETT-PACKARO CO	69- 87	80 1/4	+1 1/8	+1.4
N	NONEYWELL INC	44- 55	54 3/8	+ 5/8	+1.1
N	IBN	245-286	261 1/8	+1 1/4	+0.4
O	NANAGENENT ASSIST	5- 9	6 3/8	+ 1/4	+4.0
O	MEMOREX	23- 29	25 7/8	+ 1/2	+1.9
O	NICROOATA COPP	T- 18	9 7/8	+ 5/8	+6.7
O	NOOULAR COMPUTER SYS	5- 8	7 3/4	+ 1/4	+3.3
N	NCR	32- 38	36 7/8	+ 1/8	+0.3
O	PRINE CONPUTER INC	12- 17	17 1/4	+1 1/4	+7.8
N	PERKIN-ELNER	17- 22	20 5/8	- 1/4	-1.1
N	RAYTNEON CO	16- 33	29 7/8	- 1/8	-0.4
N	SPERRY RAND	34- 42	35 1/4	- 7/8	-2.4
O	SYCOR INC	8- 15	10 1/2	- 1/4	-2.3
A	SYSTENS ENG. LABS	5- 7	7 1/4	0	0.0
N	VARIAN ASSOCIATES	15- 21	19	0	0.0
A	WANG LABS.	14- 19	19	+2 1/4	+13.4

IEASING CONPANIES

EXCH		PRICE 19TT RANGE (1)	CLOSE JUL 13 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTNE COUFIER CORP	8- 10	9 5/8	+ 3/8	+4.0
O	CCNOISCO INC	10- 13	10 1/2	+ 1/4	+2.4
A	CCMNERCE GPOUP CORP	2- 2	2	0	0.0
A	CONPUTER INVSTPS GRP	1- 2	7/8	0	0.0
N	OATPONIC RENTAL	1- 2	1	0	0.0
A	OCL INC	1- 2	2	0	0.0
N	OPF INC	6- 8	8	+ 1/8	+1.5
N	ITEL	13- 20	19 3/4	0	0.0
N	LEASCO CORP	19- 25	24 3/4	+2	+6.T
O	LEASPAC COPP	1- 2	1 1/2	+ 1/2	+50.0
C	NRG INC	0- 0	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 14	13 3/4	- 1/8	-0.9

EXCH: N=NEW YORK; A=AMEPICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=NIUWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PPICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST OOLLAR.

SOFTWARE & EOP SERVICES

EKCH		PRICE 1977 RANGE (1)	CLOSE JUL 13 1977	WEEK NET CHNGE	WEEK PCT CNNGE
O	AOVANCEO CONP TECH	1- 2	1	- 1/4	-20.0
O	ANACONP INC	7- 9	8 7/8	0	0.0
A	APPLIEO OATA RES.	5- 9	8 7/8	- 1/8	-1.3
N	AUTOMATIC OATA PROC	23- 30	28 1/8	+ 1/8	+0.4
O	COLENAN ANERICAN COS	2- 2	1 3/4	0	0.0
O	CONPU-SERV NETWORK	10- 15	12	- 1/2	-4.0
O	CONP ELECTION SYSTNS	6- 9	9 1/4	0	0.0
O	CONPUTER HORIZONS	1- 1	1 1/4	+ 1/4	+25.0
O	CONPUTER NETWORK	6- 7	6 3/8	0	0.0
N	COMRUTER SCIENCES	T- 9	8 1/8	0	0.0
O	COMPUTER TASK GPOUP	1- 2	1 1/4	0	0.0
O	CONPUTER USAGE	1- 3	1 1/2	0	0.0
O	CONSNARE	5- T	6 3/4	+1 1/4	+22.7
O	OATA OINENSIONS INC	4- 5	3 1/2	0	0.0
O	OATATAB	1- 2	1 7/8	0	0.0
N	ELECTRONIC OATA SYS.	16- 20	19 1/4	- 1/4	-1.2
O	INSYTE CORP	2- 3	1 7/8	0	0.0
O	IPS CONRUTER NARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	+ 1/8	+3.7
O	KEYOATA CORP	2- 3	1 7/8	- 1/8	-6.2
A	LCGICON	7- 1T	L6	-1	-5.8
A	NANAGEMENT OATA	1- 2	1 1/2	0	0.0
A	NATIONAL CSS INC	19- 25	23 3/8	+1 1/2	+6.8
O	NATIONAL OATA CORP	4- 7	6 1/8	+1	+19.5
A	ON LINE SYSTENS INC	1T- 22	18 3/8	+ 3/8	+2.0
N	PLANNING RESEARCN	3- 5	4 1/2	0	0.0
O	PROGRANNING & SYS.	1- 1	1/2	- 1/8	-20.0
O	RARIOATA INC	2- 3	2 1/2	0	0.0
O	REYNOLOS & REYNOLO	17- 20	19 1/2	+ 1/4	+1.2
O	SCIENTIPIC CONPUTERS	1- 3	3 1/8	0	0.0
O	7YNSNARE INC	14- 23	21 1/4	+ 3/4	+3.6
A	URS STSTENS	4- 5	4 1/2	0	0.0
N	WYLY CORR	1- 2	1 1/4	+ 1/8	+11.1

PERIPHERALS & SUBSYSTENS

EKCH		PRICE 1977 RANGE (1)	CLOSE JUL 13 1977	WEEK NET CHNGE	WEEK PCT CNNGE
N	AODRESSOGRAPH-MULT	10- 15	13 3/4	- 3/8	-2.6
O	AOVANCEO MENORY SYS	7- 9	8 3/8	- 1/4	-2.8
N	ANPEX CORR	8- 11	10 7/8	+ 5/8	+6.0
O	ANDERSON JACOBSON	3- 5	4 1/2	+ 1/2	+12.5
N	APPLIEO OIG OATA SYS	10- 16	14 5/8	+1 1/8	+8.3
O	BEENIYE INT'L	8- 12	9 1/2	0	0.0
A	BOLT, BERANER & NEW	7- 8	6 5/8	- 1/8	-1.8
N	BUNKER-RAMO	8- 12	10 1/2	+ 3/8	+3.T
A	CALCONP	3- 5	3	- 1/8	-4.0
O	CANBRIOGE NEMORIES	1- 3	2 3/4	+	+2.3
N	CENTRONICS OATA COMP	22- 29	26 1/2	- 1/4	-0.9
O	COGNITRONICS	1- 1	1/2	0	0.0
O	CONPUTER CONNUN.	5- 6	6 3/8	- 1/4	-3.T
O	CUMRUTER CONSOLES	4- 7	4 3/4	- 3/4	-13.6
A	COMPUTER EOUIPNENT	2- 3	2 7/8	- 3/8	-11.5
O	CCNPUTER TRANSCEIVER	1- 1	1	0	0.0
O	CONTEN	9- 13	11 3/8	+ 1/8	+1.1
N	CENRAC CORP	19- 28	23 3/4	+ 5/8	+2.T
O	OATA ACCESS SYSTEMS	4- 5	4	0	0.0
O	OATA 100	6- 8	7 3/4	+ 1/4	+3.3
A	OATA PROOUCTS CORP	9- 14	14 3/8	+1 3/4	+13.8
O	OATA TECHNOLOGY	3- 4	4	0	0.0
O	OATUN INC	1- 2	1 1/2	0	0.0
O	OECISION OATA CONPUT	2- 3	2 5/8	+ 1/4	+10.5
O	OELTA DATA SYSTENS	1- 1	3/a	0	0.0
N	ELECTRONIC N & N	4- 5	4 1/8	0	0.0
O	FABRI-TEK	1- 2	1 1/4	+ 1/8	+11.1
O	GENERAL COMPUTER SYS	0- 2	1 1/4	- 1/8	-9.0
N	NAZELTINE CORP	9- 12	10	+ 3/8	+3.8
N	HARRIS COPP	28- 39	36 7/8	- 3/8	-1.0
A	INCOTERN CORP	11- 15	10 7/8	- 5/8	-5.4
O	INFORER INC	4- 7	5 3/8	+ 1/8	+2.3
O	INFORNATION INTL INC	9- 14	10 1/4	- 1/4	-2.3
O	INTEL CORP	38- 57	4a 1/2	+ 1/2	+1.0
A	LUNOY ELECTRONICS	3- 6	5 3/8	+ 1/4	+4.8
O	NSI OATA CORP	6- 10	9 1/8	- 3/8	-3.9
N	NOHAWK OATA SCI	5- 8	4 7/8	- 1/2	-9.3
O	PENRIL CORP	2- 5	4 1/2	0	0.0
A	PERTEC CORR	T- 9	7 5/8	- 5/8	-T.5
A	PGTTER INSTRUNENT	2- 2	1 3/4	0	0.0
O	RRECISION INST.	2- 2	1 1/2	0	0.0
O	OUANTOR CORP	4- 5	3 7/8	+ 1/4	+6.8
O	RECOGNITION EQUIP	6- 10	9	+ 3/8	+4.3
O	SCAN OATA	1- 2	1 1/2	- 1/8	-11.1
O	STORAGE TECNNOLOGY	10- 15	13 3/8	+ 1/2	+3.8
O	T BAR INC	T- 12	11 5/8	+ 3/4	+6.8
O	TALLY CORP.	4- 6	4	0	0.0
O	TEC INC	T- 10	8 3/8	- 3/8	-4.2
N	TEKTRONIK INC	29- 36	34 1/8	-1 5/8	-4.5
N	TELEK	2- 3	2 5/8	0	0.0
G	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EKCH		PRICE 197T RANGE (1)	CLOSE JUL 13 19T7	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 3/4	0	0.0
A	BARRY WRIGHT	10- 14	13 3/4	+ 5/8	+4.7
O	CYBERNATICS INC	1- 1	5/8	0	0.0
O	OUPLER PRODUCTS INC	14- 18	17 1/2	+ 3/4	+4.4
N	ENNIS BUS. FORNS	6- 7	6 1/4	+ 1/8	+2.0
O	GRAHAN NAGNETICS	11- 15	14 3/4	0	0.0
O	GRAPNIC CONTROLS	15- 18	16 1/4	- 1/4	-1.5
N	3N CONPANY	48- 56	48 5/8	+ 1/8	+0.2
O	NOOPE CORR LTO	27- 37	2T	-1 1/2	-5.2
N	NASNUA CORP	16- 25	24 5/8	+2 5/8	+11.9
O	STANOARO REGISTER	18- 25	23	+ 3/4	+3.3
O	TAB PROOUCTS CO	13- 17	16	- 1/4	-1.5
N	UARCO	19- 22	21	+ 3/4	+3.7
A	WABASN NAGNETICS	10- 15	13 T/8	0	0.0
N	WALLACE BUS FORNS	17- 21	18 1/2	+ 3/8	+2.0

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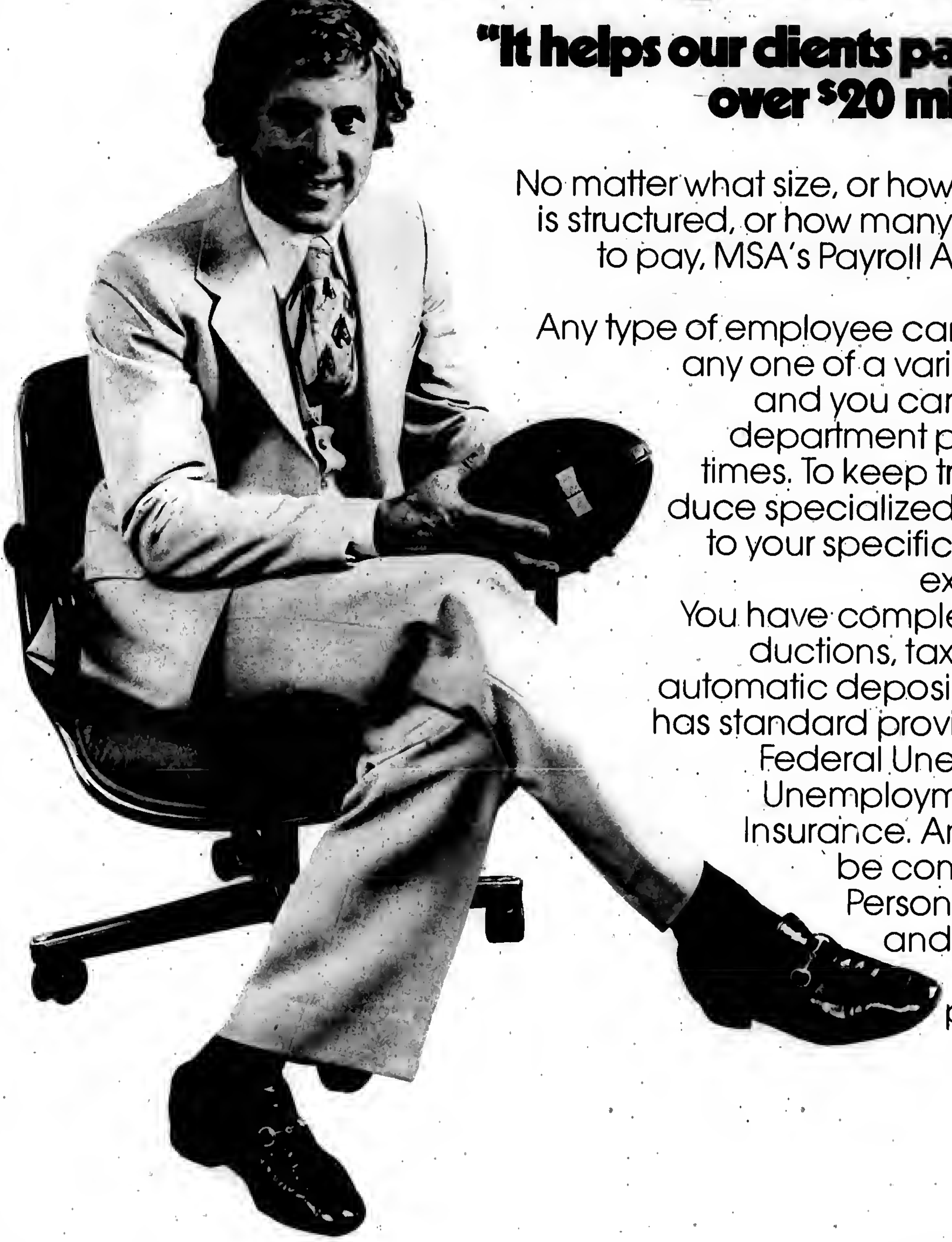

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The System That Wasn't

. Drake Lundell Jr.
Of the CW Staff

NEWTON, Mass. – Users got a glimpse at what may be Itel's next entry into the IBM-compatible CPU field through an ad the firm placed in *Computerworld* last week.

But the ad ran by mistake, Dick Grove, Itel's advertising manager, said, "and not through any fault of *Computerworld*."

Now the firm won't confirm anything that was in the ad, according to Richard H. Lussier, president of Itel's Data Products Group.

"The product we will announce, when we are ready, may be that or it may be dramatically different from that. The ad was one of several we were considering that vary in appearance and content, and it shows just one possible variation of what we may announce," Lussier said.

The ad ran as a result of a "communications problem" in the media department of the advertising agency that handles the Itel account, he added.

The firm had recently announced it plans to offer additional IBM-compatible CPUs and these CPUs will be built for Itel by Japan's Hitachi. However, Itel refused at that time to give any details of the proposed offerings [CW, July 18].

The inadvertent ad described a system called the Advanced System/6 (AS/6), said to be equivalent to the IBM 370/168-3 but priced $1 million less. It was also said to be three or four times more powerful than the Itel AS/5.

In addition, the system was said to take half the floor space of the 168 and to be air-cooled so it did not need the "intricate" water-cooling systems required by the IBM CPUs.

Although Itel said last week it would announce its plans for additions to the AS family in "the near future," apparently this may not be one of the offerings, since the firm has disavowed the ad.

What many observers expect is that Itel will wait until IBM announces its long-expected 3032 CPU, which would be an upgrade to the 370/158 in the same way

(Continued on Page 2)

Carter Revamp Plan Eyed As Threat to OTP Visibility

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – President Carter's reorganization plan that would move the Office of Telecommunications Policy (OTP) out of its place of prominence in the White House and into the Department of Commerce has met with skepticism on Capitol Hill.

Sent to the Congress just over a week ago, the President's "Reorganization Plan No. 1 of 1977" would discontinue OTP as part of the executive office of the President. The plan would retain a small telecommunications staff – as part of what would be called the Domestic Policy Staff – to brief Carter on any significant national communications and information questions that arise.

The chairmen of the Senate and House Subcommittees on Communications are concerned that national information policy issues – such as electronic mail, electronic fund transfers and a revision of the communications laws – could lose their visibility under the Presidential plan, which would create an Assistant Secretary for Communications and Information within the Commerce Department.

Accordingly, Sen. Ernest Hollings (D-S.C.) and Rep. Lionel Van Deerlin (D-Calif.) may offer legislation that would establish a full-blown agency or administration devoted to telecommunications and information policy if they aren't satisfied within the next month that OTP's present status won't be downgraded by the move, a spokeswoman for the Senate subcommittee said.

The staff remaining in the White House structure would number less than six, according to a spokesman with the President's Reorganization Office.

The Office of Management and Budget (OMB) would receive all the OTP functions relating to the management of government communications and the arbitration of interagency disputes regarding frequency allocation, he said.

OMB would also be in charge of establishing telecommunications procurement policy for the federal agencies, the spokesman noted, suggesting the General Services Administration (GSA) would play a lesser role in this area.

"All other functions except developing Presidential policy options would be transferred to a new office within the Department of Commerce, headed by a

(Continued on Page 6)

Not a Real Catastrophe

N.Y. Users Find Blackout Only a Nuisance

CW Staff Round-Up

New York's DP centers appear to have come through the recent blackout virtually unscathed.

Computer technology has apparently progressed to the point where even a major power failure is more of a nuisance than a catastrophe. In fact, many users expressed surprise at the ease and speed with which they were able to bring their systems back up after power was restored.

The major problem in most centers hit by the blackout [CW, July 18] seemed to be the backlog of work that resulted in people working extra shifts.

An IBM spokesman said his firm experienced a definite increase in service calls through the weekend after the blackout, but he could not estimate a percentage increase directly attributable to the blackout.

"Our customers were overall understanding of the situation and customer reaction was good," he said, noting that the lack of disaster stories is perhaps a result of the fact that users are well prepared for any eventuality.

A random survey of large systems users in New York revealed a surprisingly low level of frustration and a noticeable level of satisfaction with DP's ability to survive acts of God or man.

In some cases, uninterruptible power supply (UPS) systems were credited with saving a center.

The data center at Merrill Lynch, Pierce, Fenner & Smith, Inc., for example, experienced "no delay in processing" during the blackout thanks to the firm's UPS, according to Ted Vande Woude, vice-president of computer services.

"Merrill Lynch ran the whole time," he added, and even took on some work of those shops that were affected by the disaster. The brokerage house, which has three IBM 370/168s and one IBM 370/155 at its main data center, ran for "27 hours with turbines charging the batteries."

The shop has been "well-prepared for this for the last five years," Vande Woude noted, adding the regular Consolidated Edison power supply is "very poor."

"So many data centers spend a lot of time every year trying to justify spending money on a UPS system," he said, but "one incident like this pays for the expense of preparing a shop" for this kind of disaster.

Hero of the Day

In most cases, however, the hero of the day was the "power off" button that prevented damage to CPUs and disk and tape drives once the power surged back on.

The Bowne Time Sharing network headquartered in New York was out of operation for 24 hours. Minutes before power was lost, operators in the DP center noticed the lights beginning to dim and promptly pushed the stop button on the firm's dual 370/155.

Shortly thereafter, all power to the center was lost, according to vice-president Dave Herr. When power was restored about 9:30 p.m. the next evening, every piece of equipment came back on without damage. This included IBM 3330-type disks and 1270 communications front ends from Memorex Corp.

"Our only residual problem was with New York Telephone," Herr reported, because it needed power to run the pumps that keep water out of its cables. The pumps used to keep phone cables dry

(Continued on Page 2)

Users Plan to Battle Bell Bill, Fear End to Freedom of Choice

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO – Members of one of the nation's largest telecommunications user groups have voted to oppose the AT&T-fostered Consumer Communications Reform Act on grounds that it would reduce competition and limit users' freedom of choice.

The Tele-Communications Association (TCA) recently voted and put into resolution form its decision to "oppose enactment of the Consumer Communications Reform Act of 1977 in the versions submitted to date."

The TCA position was also included in a resolution that affirmed the "policy of continued competition in the private-line and telephone terminal equipment" areas. It stated further that "competition has encouraged innovation . . . and has resulted in new product offerings by all suppliers."

The TCA resolution and a supporting position paper were approved recently by a two-thirds majority of members voting on the issue. Robert Barnwell, president of TCA and corporate manager of office services at Fibre Board Corp., said he could not divulge the number of members who participated in the vote on the resolution.

TCA currently has 330 member companies with about 674 individual memberships, he said.

The TCA stand on a major national issue such as the Reform Act is considered especially significant by industry observers because most user organizations in the telecommunications area specifically forbid public statements as part of their

(Continued on Page 6)

No Business For Fraud Squad

By Catherine Arnst
Of the CW Staff

TALLAHASSEE, Fla. A special police unit organized here a year ago to train police in DP crime detection has yet to train anyone because of a lack of interest from the business community.

"Computer crime is something the business community would rather not address unless something really happens," according to Robert Martindell, a special agent with the Florida Department of Criminal Law Enforcement's Strategic Investigators Unit.

The computer crime unit is part of a white-collar division of the Department of Criminal Law Enforcement, which has statewide police powers. Martindell, who was in DP for 12 years before turning to law enforcement is the only agent with any experience in the computer field. There are five agents in the white-collar crime division.

The program was set up in August 1976, but no guidelines have been established because there are no particular cases on which to base them, Martindell said. "No one is reporting any cases due to lack of interest," he added.

Martindell has given three speeches

(Continued on Page 5)

COMPUTERWORLD
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Blackout a Nuisance, Not a Catastrophe

(Continued from Page 1)

were not operating and, as a result, cables running to the DP center were out of service until the following Monday.

Nothing was powered down when the failure came, so everything "went down hard," but there was no permanent damage to the hardware. The CPUs were stopped but still powered up after the crisis was over.

Asked about installing backup systems now, Herr said it would be very difficult. "From what we've seen, we'd have to power the entire building" to stay in operation, he said.

No Warning

At Gimbel Brothers, Inc., DP employees on-site at the time of the blackout calmly inactivated their 370/145 and manually rewound the tapes which had stopped in mid-processing, according to Mike Stearne, group financial manager of computer services for the department stores.

Stearne and two other 370/145 users affected by the unsuccessful manual attempts to rectify the problem had no warning from their systems that the power had even fluctuated a total of 8% between 9 and 9:20 p.m. or would go off at 9:34.

IBM 370/145s have an electrical component called a "motor generator" that smooths the flow of electrical power to the CPU to combat power disturbances and fluctuations, according to Stearne.

That equipment, built into the mainframe to prevent data loss or error, allows an easy transition from a voltage drop even as great as that suffered by New Yorkers before the actual blackout, Stearne explained.

Although the two second-shift employees in the DP department at the City of New York Municipal Services also had no warning from their system, they turned off the power to it when lights began flickering and dimming during the first voltage reduction.

Two employees at Data Dimensions, Inc. followed the attack plan taken by Gimbel's DPers by shutting the system down seconds after the lights went out altogether, Frank Crocitto, facilities manager, told *Computerworld.*

No Plans for UPS

None of these three users had a UPS before the blackout and none plan to get one as a result of it because, as they see it, it is unnecessary considering the small number of blackouts.

As for what the blackout "cost," the Data Dimensions spokesman noted his people who were on standby with flashlights in the computer room were bored, hot and generally uncomfortable.

After the blackout, one of these users called IBM to bring its 370/145 back up because he said he had to do so. Another opted to have IBM service engineers power-up the system and the third did it himself.

Gimbel's, Data Dimensions and the Municipal Services office all work their systems 24 hours a day so, as one user said, all that could be done after the power returned was to run the jobs faster or do critical jobs first.

Unlike many shops that returned to normal operations last Monday, Gimbel's Stearne said his shop was back on schedule by last Thursday.

Even with a staff increase, there is very little a 24-hour shop can do to get back on schedule except "pray a lot," he added.

None of the users reported any equipment damage from the blackout or related problems.

At Lever Brothers Co., flickering lights were the first indication that anything was wrong "and then everything just blitzed out," according to P. Healy, DP manager.

The DP center had no backup system, but operators were able to hit the stop button on the 370/155 and power down, so there was no damage to either equipment or data, Healy said.

Even though the system was down for 24 hours, there were no problems powering up as soon as electricity was restored, he said, but noted the center did have to wait for about an hour after that – until the air conditioners cooled the room to an acceptable temperature – to begin operating.

Tremendous Backlog

The Federal Reserve Bank was without computer resources from about 9:30 Wednesday evening until 10:45 Thursday night, according to a spokesman. But no records were lost, no equipment was damaged and "bit by bit things are being put back into order," he said.

Once the computer, an IBM 370/155, was up again, however, there was a tremendous backlog of work which resulted in many departments working over the weekend to catch up.

"All statistics we issue weekly are out; but we were still making some changes and revisions" as of last Wednesday, he noted.

He admitted, however, that some releases usually issued on Thursday did not get out until last Monday.

Interestingly, the Federal Reserve has a backup system for its offices, but not for the computer center. As a result, employees had lights and air conditioning for work on Thursday but no computer.

The bank's only real problem was the loss of its link with the national Federal Reserve communications switch in Culpepper, Va., and that was restored by Friday morning, he said.

This story was prepared by Toni Wiseman, John P. Hebert, Ronald A. Frank and Esther Surden.

Itel Ad: The CPU That Wasn't

(Continued from Page 1)

the 3033 is an upgrade to the 370/168.

Then, the reasoning goes, Itel will announce the AS/6 as a replacement for that newer system rather than for the older 168-3, as was envisioned in the advertisement.

By doing this, Itel will be placing the AS/6 in the marketplace as a competitor for a brand new IBM CPU which would be regarded as having a longer life than the older unit. It will also put Itel in the running with a compatible replacement immediately after IBM announces its product in the area, rather than several months or years later.

Originally, Itel had probably wanted to announce the AS/6 sometime in the week preceeding the July 18 issue of *Computerworld* and wanted the ad to appear immediately after the announcement, when the product would have received maximum press coverage, observers said.

The deadline for submitting a four-color ad in that issue would have been July 1 because of the way such ads are printed.

The ad was submitted to the *Computerworld* advertising department with an insertion order calling for it to appear July 18.

What happened next is a matter of conjecture, but apparently the firm decided to put off the announcement date. However, neither it nor its advertising agency informed *Computerworld* the ad was to be cancelled. Therefore, it appeared right on schedule, as called for in the contract.

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DEC's Olsen Traces Mini Roots at MIT

By Ann Dooley
Of the CW Staff

CW Photo by A. Dooley

Kenneth H. Olsen

CAMBRIDGE, Mass. – The Whirlwind computer, the first of its kind, had all the features of a minicomputer "except that it was big," Kenneth H. Olsen, Digital Equipment Corp. president, told a group of MIT alumni here recently.

The Whirlwind was really very much like the mini, he said. Although it still used vacuum tubes, it had high-speed capability, was simple and ran in real time.

It was designed at MIT during the early '50s, when researchers everywhere were "feeling their way" because the technology was so new, Olsen said.

During those first years, people thought computers had to be built "taller than a man" in order to be impressive, Olsen recalled, adding the computer room was often kept dark with lots of flashing blue lights.

MIT had an advantage over other schools because it didn't allow professors to do the research, according to Olsen, so "we didn't have to make everything elegant."

Olsen and the others who left MIT to form DEC took a lot of valuable experience with them, he said.

When Digital was started, Olsen was told to tell the company's investors three things. First, he was to promise fast results "since most of the investors were over 80," he said.

Next, he was to assure a 10% profit. Finally, he was to avoid using the word "computer" in the company name since "computers were not making any profit and weren't expected to," Olsen said.

Growth Since '50s

Since the Whirlwind was designed in the early '50s, improvements have been negligible in some ways and dramatic in others, Olsen pointed out.

There has been an enormous growth in the types of computer applications, but "we are probably still naive about their use," he said.

Some of the more observable changes in computers are their reduction in size, the increased use of memory, decreases in memory cost and the reduced size and increased amount that can be put on a chip, Olsen said.

The cost of minis has steadily decreased, enabling them to be used where they've never been used before, he said. The mainframe dollar has gone down, but users are demanding more and more memory.

As a result, computers have stayed at essentially the same price, he noted.

Mainframes will always have their place and will never be taken over by minis, which will remain as an aid.

The most recent change in the computer industry is the rise of the hobby computer market, which will have great social significance, Olsen claimed. Soon, large numbers of people, especially the young, will learn about computers, he added.

There might be some overselling and "some disappointed parents because it doesn't make their kid a genius," Olsen said, but it will be a natural growth for the most part.

When change comes through natural evolution, no one notices it or gets upset about it, and that's what has happened with computers so far, he said.

As long as the industry can be "kept free of government control" it should continue on its positive course. Right now the U.S. dominates the world computer market, but if the "government gets its hands on it, that might change," he said.

For instance, if the government were to regulate standards, there would be few new developments, he said, because everyone would be afraid to experiment.

IBM Votes to Rebuy Big Blocks of Shares

ARMONK, N.Y. – IBM's board of directors has authorized another stock repurchase, this time of up to $700 million of its shares, at the current market price.

Last February IBM issued a tender offer to its shareholders, offering to purchase up to 5.5 million shares at $280 each. It eventually purchased some 3.5 million shares at an estimated cost of $721 million.

Rather than making a tender offer, IBM currently is simply letting it be known that it would consider buying large blocks of stock from time to time, according to an IBM spokesman. The offer is aimed primarily at institutional investors since IBM is only seeking blocks of "5,000 shares or more."

In addition, IBM said it will buy only through direct transactions with "principals who aren't brokers or dealers" and who offer the stock at no more than the market price at the time of the sale.

"We continue to believe IBM stock is a good investment for a portion of our funds," the spokesman said. "Prior to our tender offer for IBM stock earlier this year, we occasionally had offers to sell substantial blocks of IBM stock [to IBM], but we didn't pursue them.

"The decision to consider purchasing these blocks is consistent with our intentions during the tender offer," he said.

"The possibility of an overhang was certainly a factor" in the latest decision to accept offers of blocks of stock, he noted.

The $700 million offer, which translates into about 2.5 million shares at current prices, is a ceiling, not an objective, he added.

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Unlike Trade Secrets, Contu Told

Economists Say Software Copyrights Better for Users

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – Of the two principal methods now available to protect computer programs – copyrights and trade secrets – the copyright gives users better market information on packages they might buy.

This was one of the findings of a team of economists hired by the National Commission on New Technological Uses of Copyrighted Works (Contu) to study protection alternatives.

At a meeting here recently, William J. Baumol, a professor of economics at both New York University and Princeton, told Contu members that copyright protection reduces duplication of effort in the software industry and tends to lead to the availability of a wider variety of products – again, pluses for the user.

"Copyright promotes disclosure. Reliance on the trade secret statutes requires suppression of information on advances in software design," according to the economists' report, entitled "Economics of Property Rights as Applied to Computer Software and Data Bases."

If software suppliers have to rely on trade secret laws, they will have an incentive to keep their programs and data bases secret to prevent unauthorized use, the report added. Furthermore, programs will tend to be written in obscure form, adding to the problems of modifying software or transferring it to another manufacturer's CPU.

Copyright protection, on the other hand, encourages the development of software that can be used for many purposes and on many different mainframes since it gives a producer of programs a wider market without fear of unauthorized use of his products.

Duplication of Effort

Not only will potential buyers of software lack information on what is available to them if programs are protected by trade secret law, but competition among suppliers also will lead to a duplication of efforts, the report said.

"Too many resources will be devoted to the development of software which is similar to existing products – too few resources will be devoted to highly innovative and more risky software developments, which are beneficial to society, but less profitable to an individual firm," the study continued.

Presenting the preliminary results of the National Bureau of Standards (NBS) "Study of Copyright in Computer-Readable Works," Roy G. Saltman, the project's director, agreed.

"This study finds that without copyright protection for computer programs, losses in information flow, increased procedures for secrecy and less opportunity for creativity would result," he told Contu.

Debate Over Time

While Contu's members heard a clear preference for copyright over other forms of software protection from those the commission hired to look into the problem and from NBS, which is conducting an independent study of the matter, they also witnessed some disagreement over the means of providing copyright protection.

From Saltman's viewpoint, the author of a computer program should not be treated differently from the author of any other type of copyrightable work. So, he concluded, copyrights should last as long for computer programs as they do for any other work falling under their protection.

But Baumol and his colleagues believe there are one or more "optimal time spans" for the protection of software. The optimal time span provides a compromise between two effects, the economist said.

"On the one hand, the longer the period of protection, the more profitable is the development of new software and the more will be produced.

"But the temporary monopoly during which a producer can charge a price for the use of his products also discourages some potential users, and in this way reduces the social usefulness of whatever amount of software is produced," Baumol stated.

The report he presented to Contu identified four economic and technological factors which tend to favor a short protection period. They include the short useful life span of software packages; rapidly increasing costs with an increase in the production of software; a user demand for programs that are very responsive to price changes; and a high discount rate.

The economists developed formulas by which the optimal protection period for software could be calculated using industry data, but Baumol noted the actual choice of a protection period will require further research in gathering the necessary data.

He further asked the commissioners not to rule out the possibility of recommending several protection periods.

There is a social cost to extending protection beyond the point at which it is really needed, Baumol said. A protection period of two or three years is reasonable for software which has an average useful life of about four years, he said, but one NBS recommendation takes a better approach and would make this distinction between software and other copyrightable works unnecessary.

That recommendation urges that an original copyright be obtained only for the source program and not the object code. This would encourage a separation of the programmer's expression from the changing hardware technology, Saltman explained.

"Furthermore, even if popular source languages are altered or improved, or if new source languages arise, the copyright proprietor retains the right to modify his work or prepare derivative works, permitting him to update the program as required," Saltman concluded. "The writing of programs in source languages that can be expected to endure is promoted."

One argument often cited against copyrighting computer programs is that the software industry is so strong that protection is unnecessary.

However, the NBS preliminary study pointed out that copyrighting is not aimed at protecting an industry, but rather at protecting a particular work in the marketplace.

This government agency has concluded that copyright protection is particularly important for the smaller company that does not have the resources to engage in retaliatory measures or to protect itself from predatory practices of larger firms when its software is endangered.

On the subject of computerized data bases, the NBS contended that while it is "not immediately clear . . . whether the initial deposit [of data bases with the Copyright Office] should be a printout or a magnetic tape or disk . . . It seems reasonable to suggest that it should be the complete data base, not just identifying descriptions."

In the case of a data base that is continuously updated, the deposit of the complete data base could be required at least once in a period of several years – for example, every 10 years, Saltman stated.

Baumol Sees Software Growth Stimulating Economic Growth

WASHINGTON, D.C. – Encouraging software design, whether through copyright protection or by other means, is an important element in stimulating economic growth, William J. Baumol, professor of economics at both New York University and Princeton, said here recently.

Addressing the National Commission on New Technological Uses of Copyrighted Works (Contu), Baumol added that "declining costs of computer hardware and expanding opportunities for automation imply that computer hardware and software together will play an increasingly crucial role in our economic future."

Just how crucial a role does the economist foresee for computer technology?

Baumol cited a study he and several other economists made on the costs of library operations and publications some years ago." These costs turned out to be remarkably different from costs in the economy as a whole," he said.

While the level of general inflation was 1.5% at that time, the rate of inflation facing libraries and publications was between 6% and 7% and compounding annually.

Because labor is an essential part of the product traditional information institutions produce, their costs will continue to go up, Baumol said. As a result, he noted, there are increasing economic pressures for finding substitutes for the traditional means of disseminating knowledge.

Electronics costs have gone in the opposite direction of those of libraries and publications, Baumol stated, and there is "no reason to suspect the end of that trend is in sight."

Before long "we will have electronic substitutes for the information that has been stored in library stocks and contained in printed matter," Baumol maintained. "We may not like these substitutes, but economics will press us toward them."

The devices to replace or take over many library and publication functions already exist. However, they are little used because people are unfamiliar with them and, for the moment, they are more costly than traditional information approaches, Baumol said. In two decades, however, "what is science fiction today will be reality."

Three Counterclaims Dismissed In Brewer's Case Against EDS

NEW YORK – The case of F&M Schaefer Brewing Co. vs. Electronic Data Systems Corp. (EDS) has proceeded one step further with the dismissal of three counts of fraud brought by EDS against the beermaker.

In a recent ruling here, Judge Constance Baker Motley granted Schaefer's motion to dismiss three of EDS' counterclaims, all relating to fraud. Each of the counts, which were similar, asked for $4 million in damages, according to Thomas K. Christo, Schaefer's attorney.

Motley ruled EDS could not claim fraud against Schaefer. The ruling left three of EDS' counterclaims still before the court, although their importance is unclear, according to Christo.

The principle counterclaim of those remaining – one that has gone unchallenged by Schaefer – is breach of contract. Schaefer did not act on that count since it has already paid $1.3 million in a repleven action [CW, March 21].

In its suit, Schaefer claimed the computer system developed for it by EDS was inadequate and substantially similar to Schaefer's original system.

Motley denied the motion to dismiss the remaining two counts for equitable relief and for replevén. In doing so, she indicated repleven had essentially been granted by the court in March, Christo said.

Motley also denied the motion to dismiss equitable relief, which seeks to prevent disclosure of how the system works, seeming to indicate the point was moot since Schaefer had already stipulated to such an agreement, according to Christo.

The trial is scheduled to begin Nov. 14.

Users' Report...

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Copies are available pre-paid only from Mercury Communications, Inc. 730-CW Mission, Santa Cruz, CA 95060. $55 includes 3-5 day delivery inside USA. In Calif. add $3.12 tax.

Privacy Report Warns Against Fed EFT, FBI Switch

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The Federal Reserve System's experimental electronic banking system and the Federal Bureau of Investigation's (FBI) proposed computerized message-switching system are both serious threats to individual privacy, according to the Privacy Protection Study Commission.

In its final report delivered to President Carter and the Congress recently [CW, July 18], the commission said "current problems with government access to bank records are minor compared with the potential threat to privacy posed by government operation of [electronic funds transfer (EFT)] facilities."

In light of its findings, the commission recommended that "no governmental entity be allowed to own, operate or otherwise manage any part of an electronic payments mechanism that involves transactions among private parties."

As for the message-switching system that would be operated by the FBI as a service to state and local law enforcement agencies, the commission said the system could permit the bureau "to collect and use information to which it might not be legitimately entitled."

While it made no formal recommendation on the system, the commission advised that any decision to give message-switching authority to the FBI or to any other federal agency should be made only if there is no alternative – and such a decision should then be made only by Congress.

Current System Not Useful

On the matter of EFT and the Federal Reserve's role in it, the commissioner's investigators found the current paper check-clearing system now operated by the Federal Reserve is not a useful source of information for government agencies because the system does not allow checks to be retrieved easily or selectively.

The situation changes, however, when the Federal Reserve uses telecommunications technology for processing private transactions, the report said.

Here, the commission learned, the Department of Justice has requested that the Federal Reserve supply it with information from records of transactions between private parties.

The commission said further that the Federal Reserve System's regulation of the financial community should not be tied to government operation of an electronic payments system. Even if a monopolistic but closely regulated EFT system does emerge, the agency that will have to oversee it should not also be in the role of operating its facilities.

The commission's argument here was supported by its general finding that "when any government entity processes financial records which document the private affairs of individuals, the likelihood and opportunities for other government agencies to obtain and possibly misuse those records increases."

For the Federal Reserve to continue its control over facilities for EFT is unwise, in the commission's view, particularly in light of the possible meshing of ACH services with point-of-sale services. Unless the Federal Reserve limits its EFT operations and begins divestiture now, the inertia of economic circumstance may destroy the policy choice.

Moving to the FBI's message-switching system, the commission focused on three problems it found "particularly pertinent" to the protection of personal privacy should the FBI control such a computerized communications facility.

First, there is little control over how criminal justice information is recorded, maintained and used – particularly when it comes to accuracy, the report said.

Further, the information in such file systems is ordinarily derived or "copied" from another record, which in turn may be a copy of a third. The chances for error in transferring information from one record to another are great, particularly when the first transfer is from a paper record.

These vulnerabilities to error "create a system with inherent accuracy and reliability problems but one which, nonetheless, is used to make decisions that affect individuals powerfully and immediately.

The second problem cited in the report grows out of the current pattern of unrestricted information flows between law enforcement and investigative agencies at all levels of government.

While not critical of this per se, the commission noted that "easier access to information by agents within a unit and greater facility to exchange information between units will increase the potential for abuse."

The third problem relates to the question of federalism. At one level, it is a classic problem of the proper role of the central government in furnishing local services. At another level, however, it is a problem posed by one agency operating the information services on which other agencies depend and thus being able – at least potentially – to control the format of the other agencies' records and to use those records for its own purposes, the commission said.

While such an ability is only potential, the transformation of that potential into actuality has occurred before.

It occurred between April 1971 and February 1974 when the FBI monitored requests for information in the NCIC made by state and local government agencies. The monitoring involved flagging the names of persons in whom the federal agencies had some interest, including 4,700 who had no criminal record, the commission said.

Florida Fraud Squad Not Yet in Operation

(Continued from Page 1)

to Florida businesspeople; he received the best reception from the American Society of Industrial Security "because it is in that business."

"We are trying to let the business people know perpetrators can be punished," Martindell said. Computer crime would be treated as "another case of grand larceny . . . the investigative procedures are pretty much the same, but without a specialized training program agents can't deal with it."

The Federal Bureau of Investigation has shown some interest in the Florida program and will be presenting a four-week training program in computer crime in Quantico, Va., this summer.

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Carter Plan to Move OTP Seen as Possible Demotion

(Continued from Page 1)

new Assistant Secretary for Communications and Information, who will perform many of the functions previously performed by the head of the OTP," Carter said in his letter to Congress.

The President's Reorganization Office suggested the staff in the Commerce Department be responsible for general policy development and act as the Administration's spokesman on telecommunications issues.

In addition, the old OTP organization, which would be combined with the Office of Telecommunications in the Commerce Department, would coordinate U.S. participation in international communications conferences and negotiations, perform national telecommunications policy analyses and make frequency assignments to government agencies, the spokesman stated.

When OTP and Commerce's telecommunications office are merged, the new Assistant Secretary for Communications and Information will have a staff of approximately 200 people, he added.

Lost Coherence?

Hollings and Van Deerlin do not want to see the degree of coherence in OTP's past efforts regarding information policy lost in its incorporation into the Commerce Department, and they fear this organization won't have enough of substance to do, the Senate subcommittee spokeswoman said.

If Congress takes no action on this reorganization plan in 60 days – in this case, by Sept. 15 – the President's proposals will go into effect. The first 30 days are considered a "clarification and amendment" period, during which the Administration can answer concerns raised by members of Congress.

During this time period, the Senate and House Communications Subcommittees hope to learn whether all decisions and power regarding information and communications policy will in fact be vested in OMB and the Domestic Policy Staff, the spokeswoman said.

If this does happen, they will propose the creation of a Telecommunications Information Administration headed by an administrator under the Commerce Department, she stated.

What makes an administrator better than an assistant secretary? An administrator has a higher salary and a more visible position in the federal government, the spokeswoman said.

"It would be like giving telecommunications and information policy a house in which to live, rather than an apartment in a high-rise building," she added.

There are already five assistant secretaries in the Commerce Department. The position of administrator would provide national information policy with a better "presence" and the public would have more effective access to their government in this area, the spokeswoman said.

Hollings and Van Deerlin are not alone in their concern over the President's plan. Earlier this month, the president of the American Federation of Information Processing Societies (Afips), Theodore J. Williams, wrote to Carter asking him to take into account the importance of OTP and the National Bureau of Standards' (NBS) Institute for Computer Science and Technology in any reorganization plan.

Williams detailed the activities of OTP and the institute and expressed the hope of computer and communications professionals within Afips that the expertise these bodies have will not be lost.

"As you know, Congress is now reconsidering in committee the Communications Act of 1934, as well as instituting a study through the Office of Technology Assessment on related technologies," Williams wrote to the President.

"We believe that as the Congress focuses on telecommunications, computers and information policies as areas of broad national attention, it is important for the executive branch not only to recognize the significance of this area, but to be in a position to adequately respond to proposals which will be forthcoming from the Congress," he said.

"Further, we believe that a coherent national policy is necessary to, first, allow unfettered growth of this beneficial technology, free of unnecessary regulatory intervention; and second, that government decisions in areas which are regulated (including communications, electronic mail and electronic banking) are indeed made from a broad perspective of national policy considerations, and in a full understanding of the many interrelationships which exist between the regulated and nonregulated sectors of these technologies," Williams added.

The Afips president offered his federation's assistance to the reorganization effort in this area.

U.S. vs. IBM Traveling Again

By Catherine Arnst
Of the CW Staff

NEW YORK – The U.S. vs. IBM antitrust trial will hit the road again this week with a return appearance in Florida and an overseas performance in London.

The parties have agreed to complete the testimony of two witnesses who are unable to travel by going to them and taking their testimony by deposition. This testimony then will be submitted as evidence.

One of the witnesses will be Ernest Hughes, a retired IBM employee who first took the stand in Miami last December [CW, Dec. 6].

IBM had requested that Hughes and three others on the firm's list have their depositions taken before the defense portion of the trial begins in order to assure their testimony is heard. These witnesses are either elderly or unable to travel.

Judge David N. Edelstein agreed to hear Hughes last December since he would be in Florida, but he rapidly lost patience with the lengthy questioning of the witness and refused to stay beyond the two days he had originally allotted. Consequently, the rest of the witness' testimony will be completed via deposition starting Tuesday in Fort Lauderdale, without Edelstein's presence.

Attorneys will be going to London Wednesday to depose Richard Saalfeld, a vice-president with the Bank of America. Saalfeld appeared in New York in April [CW, May 16], but contracted hepatitis before he completed his cross-examination. Although he is considered to have recovered, he is still unable to travel or even to work full days.

Meanwhile, back in the main showcase of U.S. vs. IBM, Frederic G. Withington, a financial analyst with Arthur D. Little, Inc., is on the stand.

Withington fought his appearance as an expert witness for the government all the way up to the Second Circuit Court of Appeals and lost.

Willing or not, Withington was ordered to comply with his subpoena and testify.

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Users Vote Against Bell Bill

(Continued from Page 1)

bylaws.

TCA has sought to become more involved in outstanding issues that affect telecommunications users; some time ago it participated in a California rate proceeding. The latest resolution is believed to mark the first time that a major user group has taken a stand on an important telecommunications issue.

TCA has thus far sent copies of its resolution and position paper to Rep. Timothy Wirth (D-Colo.), Sen. Barry Goldwater (R-Ariz.) and members of the Federal Communications Commission (FCC), Barnwell said. The TCA position will also be sent to House and Senate subcommittees when future hearings are held on issues related to the Reform Act.

Competition 'Most Gratifying'

TCA takes the position that the results of FCC-approved competition have been "most gratifying" from the viewpoint of the user. According to the resolution, "numerous new products and services have been introduced to fill voids that existed in the telephone carrier's product lines."

As a result, "latest state-of-the-art technology has become available permitting the business consumer to optimize his telecommunications systems," the paper said.

"The net result is the consumer can now choose from a proliferation of products and services that can fill almost any business need. The disadvantages inherent in dealing with a single supplier have been virtually eliminated."

Commenting on the portion of the Reform Act that would give individual states the power to regulate terminal equipment used in interstate communications, the TCA said this would have the effect of "fragmenting authority over the interstate communications network into 50 separate state jurisdictions.

"The end result would be a hodgepodge of diverse and differing regulatory policies with respect to the rights of consumers to supply their own communications devices."

In opposing the Reform Act, the paper said, "the evidence collected thus far indicates no economic harm has come to the telephone industry as a result of the FCC's selective competition policies. To reverse [these policies] and return to a monopolistic structure would clearly be to the detriment of American consumers and the entire telecommunications industry."

Additional details concerning TCA activities are available from Robert Barnwell, Fibre Board Corp., 55 Francisco St., San Francisco, Calif. 94133.

They Were Blazing Mad...

ROME – A trio of women armed with guns held three Rome University staff members at gunpoint as a male accomplice set a computer center on fire here recently.

Covered with gasoline before being set aflame, the computer was totally destroyed. Damage to the center was estimated to be at least $2 million, according to sources.

The motive for the incident is unknown.

Compromise Funding Revives VA's Target System

Washington Update

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Like a cat, the Veterans Administration's (VA) controversial claims-processing system called Target has come back to life again.

In a conference committee meeting here recently, the Senate Appropriations Subcommittee gave way to the House of Representatives' position on most aspects of the system proposal. The result was a compromise designation of $18.4 million for Target in fiscal year 1978.

The money will permit the VA to go forward with the construction of its central Target facility in Chicago.

The conference further determined that of the three regional centers to be built in Chicago, Los Angeles and Philadelphia, only the Chicago center will be established at the present time.

Speaking for the House Appropriations Subcommittee, Rep. Edward P. Boland (D-Mass.) maintained the system could save the VA between $60 million and $70 million over the next 10 years.

"There is no real substantive reason for turning this system down," Boland said. He added that "members of Congress should not be in the business of choosing agencies' computer systems."

Technology: Ignore It; Maybe It Will Go Away

The House Committee on Post Office and Civil Service began hearings last week on a bill designed to revise postal operations in light of the spiraling costs of the U.S. Postal Service.

Contrary to the recommendations made in a spring report by the Commission on Postal Service, the "Postal Reform Act of 1977" (H.R.7700) does not require the post office to investigate the possibilities of electronic mail technology.

H.R.7700 calls for the appropriation of funds for a stronger research and development program within the Postal Service, but "that's as specific as we felt we could get," a spokeswoman for the House Subcommittee on Postal Operations and Services said.

The subcommittee chaired by Rep. James M. Hanley (D-N.Y.), who sponsored the bill along with Rep. Charles H. Wilson (D-Calif.), indicated during hearings on the commission's report that it wanted better R&D and better Presidential and congressional oversight, she added.

"But the technolology changes so fast . . . How can we delineate what we want the Postal Service to do?" the spokeswoman asked.

A Shot in the DOT

For the National Law Enforcement Telecommunications Systems (Nlets) board of directors meeting in Atlanta in May, the decision whether to permit the National Driver Registry (NDR) to use its statewide communications system was a moot point.

Nlets understood that NDR officials would look elsewhere for a telecommunications network to run their pilot national computer system designed to help states identify drunk and reckless drivers and keep them off the road, according to C.J. Beddome, Nlets executive director.

Accordingly, the board decided the matter wasn't worth another official vote.

But the U.S. Department of Transportation (DOT), of which NDR is a part, expected Nlets to reconsider its January decision that even the pilot system would he too large for the Nlets network to handle, NDR contract officer Jim Lockard said.

NDR considered Nlets concern for the size of the project "honest" and expected to pay for the additional hardware needed to manage the traffic the license validation system would create, Lockard added.

NDR had to look elsewhere after Nlets' first denial and will continue to do so now in the absence of any further word from the organization, Lockard noted.

Among the alternatives NDR is investigating is the possibility that the DOT computer center will develop a network of its own. That network could take longer to build than NDR has to wait, however, Lockard said.

NYU Program Offers Degree in One Year

NEW YORK — A new diploma program in computer technology which can be completed in one year of evening classes will he offered by New York University's (NYU) School of Continuing Education in September.

The 16-credit program was designed to provide the necessary skills to land an entry-level position as a computer maintenance technician or to upgrade skill levels of individuals already employed in the electronics industry, the University indicated.

Students in the program will meet twice a week from 6 p.m. to 10 p.m. for two semesters.

Tuition is $925 per semester; an admissions test and interview are required.

Applications should be submitted by Sept. 1. Candidates should have completed two years of college, but students with exemplary experience or personal achievement will also be considered, according to the university.

Additional information is available from the NYU School of Continuing Education, Shimkin Hall, New York, N.Y. 10003.

Course to Cover DP In Art

NEW YORK — A mini course that explores the computer's role in the arts will be offered at Columbia University here in October.

Among the guest lecturers and artists who will address the class are Charles Dodge, an associate professor of music at Brooklyn College; Genevieve Greenwald-Katz, an architect; Ken Knowlton, computer artist and technical staff memher at Bell Telephone Lahoratories; and Lou Katz, computer facility director at the university's Cancer Research Center.

The course will cost $100. Information is available from Jessica Gordon at Columhia University Program for Continuing Education, New York, N.Y. 10027.

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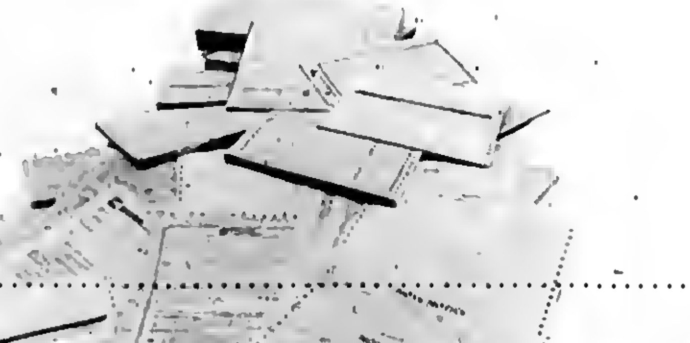

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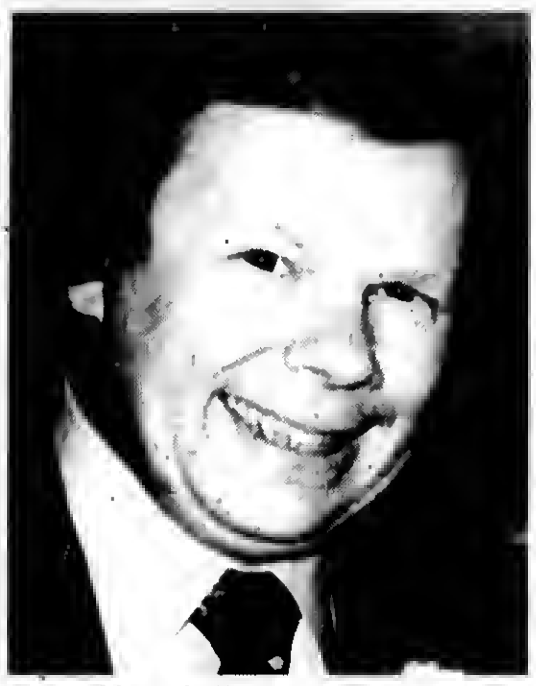
Systems Analyst Sought by FBI for Fraud

NEWTON, Mass. — The Federal Bureau of Investigation (FBI) has asked *Computerworld* and its readers for help in locating Henry Joseph Manning, systems analyst wanted for bank fraud and embezzlement and mail fraud.

Manning is also known as Paul H. Allen, Harold David Bradley, Allen Collins, Dr. James Parker, David L. Robinson and Charles Tulley, the FBI said.

Manning, who is believed likely to seek employment in the computer field, is also wanted by the State of California as a prison escapee. He has reportedly passed thousands of dollars worth of fraudulent checks around the country.



Wanted: Henry J. Manning

Warrant Issued

A federal warrant for Manning's arrest was issued on March 4, 1976 at Kansas City, Mo.

Manning was described as a white male American, born on Nov. 8, 1937 in Denver, Colo., although he has also used Dec. 19, 1941 and April 16, 1942 as dates of birth.

He is 6'1" tall, weighs approximately 200 pounds and has brown hair and blue eyes. He has eight slash marks on his inner left arm, a cut scar over his right eye and an appendectomy scar.

Armed and Dangerous

Manning's Social Security number is 528-44-6655, although he has used numbers 432-26-2981, 457-11-3326, 451-88-4799, 452-23-9281 and 502-43-7063.

Manning has been diagnosed as a paranoid schizophrenic with suicidal tendencies. He should be considered armed and dangerous, the FBI said.

Anyone with information concerning Manning is requested to take no action other than to contact the nearest office of the FBI, the telephone number of which may be found on the first page of most local telephone directories.

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State, Federal Laws Dealing With Privacy Reach Total of 333

WASHINGTON, D.C. — More than nine states have now passed fair information practices acts that limit disclosure of personal data in state information systems and allow individuals to see and correct their own files.

This year's *Compilation of State and Federal Privacy Laws* published here recently by the *Privacy Journal*, a newsletter "on privacy in the computer age," indicated there are now more than 300 state laws affecting the confidentiality of personal information.

No state has yet passed privacy legislation affecting data collection in the private sector, however, although two — Maine and California — require private and public employers to allow persons to see and correct their own personnel files, the report said.

According to the compilation, 16 states and the federal government now regulate the consumer credit reporting industry and 20 states provide their own privacy safeguards for criminal justice information systems.

The states with fair information practices acts similar to the federal Privacy Act of 1974 are Arkansas, Connecticut, Indiana, Massachusetts, Minnesota, Ohio, Utah and Virginia and, most recently, Indiana.

An additional six states have enacted security safeguards for their state information systems, but do not provide individuals with a means to inspect and correct data about themselves, the report stated.

Laws Categorized

Privacy Journal's 1977 edition includes state and federal laws in the following categories: arrest records, bank record, consumer credit reporting, criminal justice information systems, government data banks, employment records, medical files, polygraphing, confidential privileges, school records, Social Security numbers, tax records, wiretapping and general privacy protections in states laws or constitutions.

The 1977 edition includes descriptions and citations for all statutes, including several enacted since the compilation was published in 1976. It also includes the texts of 28 representative state and federal laws on privacy.

The 215-page book of 333 privacy laws is available for $12.50 from *Privacy Journal*, P.O. Box 8844, Washington, D.C. 20003.

Scot Gets HP Award For Thin Film Work

PALO ALTO, Calif. — The 1977 Hewlett-Packard Europhysics Award, which carries with it an $8,000 cash prize will go to a professor at the University of Dundee in Scotland.

The winner, Prof. Walter Eric Spear, D.Sc., who is on the staff of the university's Carnegie Laboratory of Physics, is being honored for his contribution to the physics of thin film semiconductor technology.

The award, which is presented by the European Physical Society (EPS) for outstanding achievement in the field of solid-state physics, is donated by Hewlett-Packard S.A., HP's European headquarters organization.

Spear, whose academic title is equivalent to a Ph.D., is being cited for work that led to the discovery that electrical properties of thin film semiconductors could be altered by introducing impurities. This opened the way to a new range of semiconductor devices.

The first application of these devices is in the fabrication of a solar cell that absorbs the sun's rays better than previous materials. In addition, the technique lends itself to the fabrication of large solar panels at lower cost.

Spear will receive the award at the Third EPS Condensed Matter Division Conference in Leeds, England, this month.

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Several opportunities exist for individuals with three to five years experience in mini-computer software systems development to implement data entry applications and operating systems software. Implementation responsibilities include detail design, structured implementation and testing of System 3300 software. These openings offer programmers an opportunity to learn contemporary software development techniques while contributing to the success of this new product line.

System 5000

System 5000 uses the same mini-computer base as the System 3300 to address customer requirements in accessing and maintaining the numerous files of information necessary to conduct business on a daily basis. While closely related to the data entry market, System 5000 provides power tools for managing and tracking information *after* it has been entered with a computer. Sophisticated file management software allows the System 5000 user to enter, retrieve, update and process information in an on-line, real-time manner.

Specific opportunities exist in the System 5000 group to design, implement and test new file management software. Individuals with three to five years experience in implementing mini-computer turnkey systems will find an opportunity to apply their problem-solving skills while learning contemporary software development techniques. Prior experience in operating systems and/or data base management is required.

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We are looking for mini-computer programmers who have experience with turnkey and end-user systems. These individuals will work with Assembly Language programmers developing software for our Intelligent Key Entry Product. You should have seven to nine years programming experience, a Bachelors Degree in Computer Science, Mathematics or related discipline.

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Indiana Enacts Privacy Laws Covering State Agencies

By Molly Upton
Of the CW Staff

INDIANAPOLIS — Indiana's legislature and governor have approved a bundle of privacy laws, many of which appear to parallel those applying to federal agencies under the Privacy Act of 1974.

The state's Fair Information Practices Act does not apply to the private sector and covers only state agencies that report to the governor. This excludes those under the state auditor, treasurer, secretary, attorney general, the department of state police and the state-supported institutions of higher education.

This law provides a procedure by which records kept by various state agencies may be declared confidential and declares that after July 1, 1978, all records are public except those categorized as confidential.

Under another privacy law, information retained in both manual and computerized files must be deemed relevant and necessary to that agency's purposes; all other data shall be expunged upon annual review.

Individuals have the right to see and correct their files: Agencies must provide the file's recipients with either a correction or a copy of the subject's statement disputing the record.

Under still another law, state agencies must file an annual report with the governor delineating the type of personal information systems it maintains as well as how to contact the person immediately responsible for keeping the system in compliance with the new privacy laws.

As of Jan.1, 1978, Social Security numbers may not be required except by revenue, welfare, employment and state personnel agencies, unless the agency is required by federal law to obtain the number.

Limitations will be placed on the sale of compiled information by the Bureau of Motor Vehicles.

DP Oversight Committee

A data processing oversight committee, established by the legislation, is in charge of "coordinating the operations of the various data processing systems within the administrative branch of state government [and] developing consistent policy . . ." It is also responsible for "promoting economical, effective and integrated DP services, operational security and adherence to the principles of the code of fair information practices for individual privacy."

The laws also differentiate between criminal history and criminal intelligence information, and they limit the type of information that may be collected and stored on individuals for criminal intelligence purposes.

In line with other edicts attempting to eliminate extraneous information, a law permits individuals with no records of prior arrest and no criminal charges pending to petition to have their mugshots and fingerprints destroyed if no criminal charges are preferred or if charges are dismissed.

If the petition is granted, the arresting agency would not be permitted to forward a record of the arrest to any local, regional or statewide repository for criminal history information, according to one of the new laws.

Preparing for Implementation

The laws were drafted by the Governor's Commission on Individual Privacy. The commission was established two years ago and it disbanded upon passage of seven of its eight proposals, according to James T. Smith, liaison between the commission and the governor's office.

Prior to the new legislation, the state had no laws addressing privacy, he said.

In order to prepare for implementation of the Fair Information Practices Act, each state agency directly responsible to the governor is to go over its records of personal information and sort out those it thinks should be maintained on a confidential basis.

The governor and legislature will then declare as confidential those records they vie as falling in this category.

Annual Inventories

State agencies are also required to conduct annual inventories of their records and justify to the Commission of Public Records their retention of, or recommendation for disposition of, various records.

Although the Bureau of Motor Vehicles (BMV) may continue to sell individual records, effective Jan. 1, 1978 it will be allowed to sell compiled records only when the purchaser certifies the information is to be used only to notify owners of vehicle defects or for research or statistical reporting purposes. In such cases, individual identities must be properly protected and not ascertainable from the published reports or research results.

The DP oversight committee consists of representatives of the governor and auditor, the director of the Budget Agency and the Commissioner of the Department of Administration.

Intelligence Records Defined

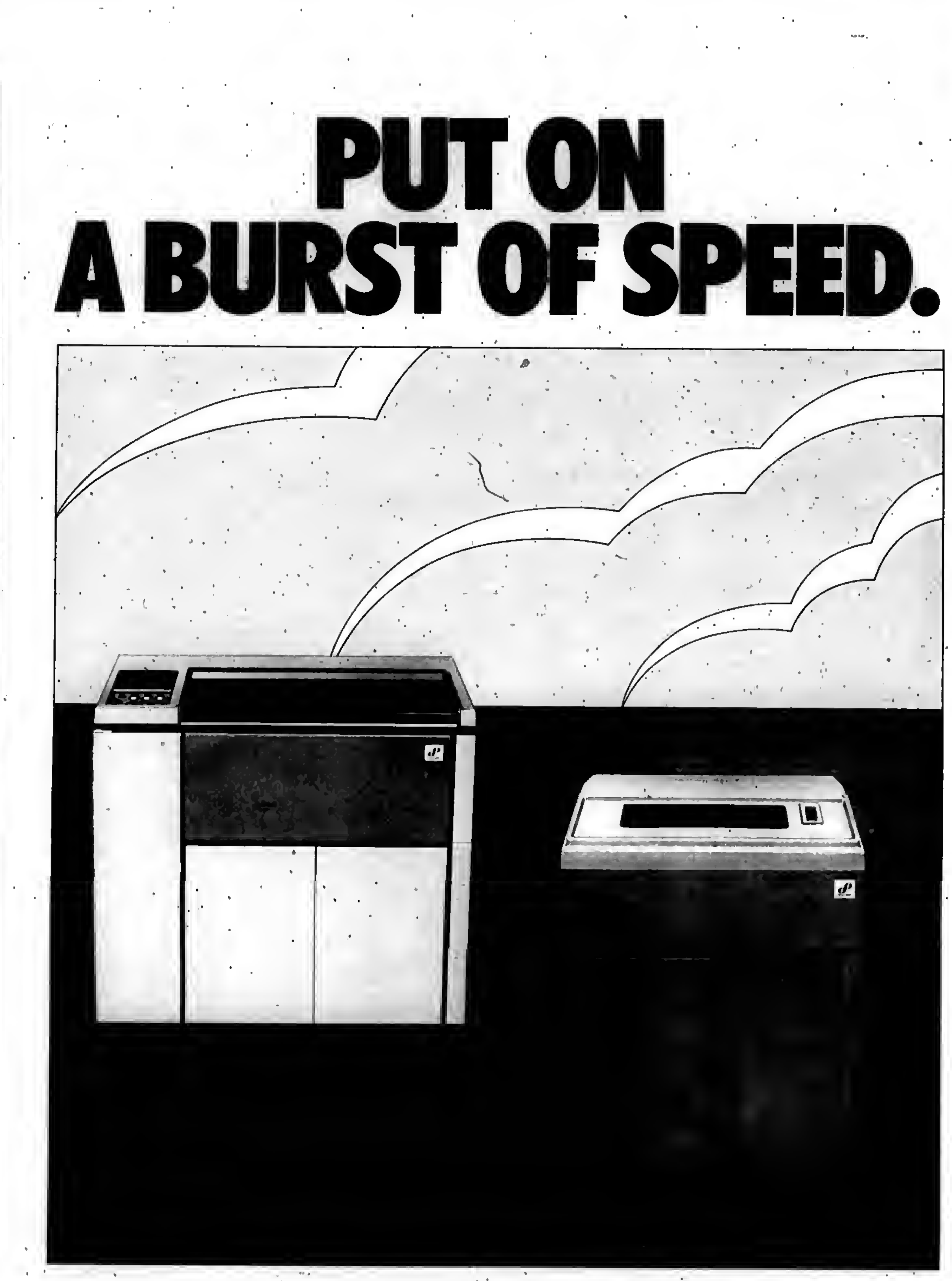
Criminal intelligence records are defined as "information on identifiable individuals compiled in an efort to anticipate, prevent or monitor possible criminal activity."

As of Oct. 1, 1977, such data may be collected and maintained "only if grounds exist connecting the individual with known or suspected criminal activity and if the information is relevant to that activity," according to the legislation.

"No information is to be collected or maintained about the political, religious or social views, associations or activities of any individual, group, association, corporation, business or partnership unless such information directly relates to an investigation of past or threatened criminal acts or activities and there are reasonable grounds to suspect the subject of the information is or may be involved in criminal acts or activities.

"Criminal intelligence information is declared to be confidential and may be disseminated only to another law enforcement agency ... ."

The disseminating agency must be satisfied that the recipient has a genuine need to know and that it will safeguard the confidentiality of the information, the law said.



DP on Fiche

GLOUCESTER POINT, Va. — An annotated bibliography on the computer's impact on society is available on microfiche from the Virginia Institute of Marine Science.

Prepared under the auspices of the Education Board of the Association for Computing Machinery, with a grant from the National Science Foundation, the bibliography contains more than 2,000 entries of books, articles and other items, most of which are annotated.

The list is alphabetical by author and is stored in a hierarchical storage and retrieval system at the University of Wisconsin. Special-purpose subsets may be obtained.

The complete set costs $2.30 for U.S. orders and $3.30 for others from Gerald L. Engel, Department of Computing and Statistics, Virginia Institute of Marine Science, Gloucester Point, Va. 23062.

Model Legislation Needed

Lawyers Urge Industry Action on Taxes

By Molly Upton
Of the CW Staff

SAN FRANCISCO — The computer industry could and should play a more active role in deciding how its products and services are taxed, speakers at a recent Computer Law Association conference here agreed.

The DP industry needs to formulate model legislation and take more action regarding assessment of equipment, they said.

Currently, various states have asked what the industry position is on taxing various aspects of DP, according to Al Eisenstat, vice-president and corporate counsel of Tymshare, Inc. However, the industry does not have a succinct statement of its position.

It will be inordinately difficult to get the various segments of the industry to agree on anything more specific than "nothing related to DP should be taxed" and "there should be no retroactive taxation" Eisenstat pointed out.

But if model legislation could be drafted, perhaps it could be distributed for use by groups in various states as they wish, rather than factions such as software and services firms hammering it out on the national level, he suggested later.

At the very least, there should be some legislation recommending uniform treatment of DP products and services on an interstate basis, he said.

According to Eisenstat, the Association of Data Processing Service Organizations (Adapso) is the logical group to draft the model legislation, since it represents several areas within DP. He said he will continue to move to get Adapso to allot funds to have professionals help draft the legislation.

Attorney Robert H. Fabian told attendees they can help themselves by developing and encouraging the use of services which evaluate current market value and comparable sales prices of DP items.

Often, because tax authorities generally are not willing or able to apply the same techniques to DP gear as to other areas, assessors may look to industry sources for estimates of the current market value of DP hardware and systems, Fabian said.

The industry itself must be aggressive in steering the course of events in the tax area because of the inconsistencies and wide discrepancies which exist both in definitions and in motivation from one taxing jurisdiction to another, he stressed.

Michael Berwind, an attorney with Chickering and Gregory, said records of comparable prices may be a valuable aid in dealing with tax problems at the federal level.

The Internal Revenue Service may look to the rental terms of competing lease proposals and at other vendor or user documentation in arriving at the "fair rental value" of equipment in making a lease/-purchase determination, Berwind said.

New York Set to Hear DP Tax Suggestions

ALBANY, N.Y. — An informational hearing for all interested parties will be held by the state tax commissioner here to gather recommendations for regulations taxing DP in the state.

These will then be considered and submitted to the state tax commissioner. If they are approved they could become regulations, according to Peter Crotty, deputy commissioner and counsel for the State Department of Taxation and Finance.

There is a growing dispute in New York State over what is subject to sales tax. A 1966 statement unearthed by Robert Sherin, who is involved in fighting DP taxation in several states, says that software is exempt from taxation.

The following question and answer: "Q. 194. Are services involving the analysis, planning, design and programming of electronic data processing systems exempt?

"A. Since this service is not specifically made subject to the sales tax under Section 1105, it is exempt."

But then in 1973 the New York law on sales and use taxes seemed to take an opposite view. There, Section 55-069 states, "The furnishing of information by printed, mimeographed or multigraphed matter or by duplicating written or printed matter in any other manner, including the service of collecting, compiling or analyzing information of any kind or nature and furnishing reports thereof to other persons, but excluding the furnishing of information which is personal or individual in nature and which is not or may not be substantially incorporated in reports furnished to other persons ... ." is taxable.

Some firms claim they received notices of deficiencies in tax payments prior to 1973 — before the regulation was written.

Crotty admitted that past pronouncements weren't "full approaches" and have led to the differences of opinion.

The meeting will be held at 10 a.m. on Aug. 23 in Room 206, Building Nine of the State Office Campus here in Albany.

Those interested in appearing at the hearing should notify Arnold Glass of the Sales Tax Regulation Task Force, Building 9, State Campus, Albany, N.Y. 12227, and should prepare six copies of their statements.

Those who wish to enter statements in the record should submit them by Aug. 11 to the above address.

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Bell Companies Get Nod to Collect Political Donations

By Ronald A. Frank
Of the CW Staff

NEW YORK – Bell System operating companies have received the go-ahead to collect contributions from management employees for use in funding political campaigns as a matter of official company policy.

According to an announcement issued this month by AT&T chairman John D. deButts, individual Bell companies will be able to set up political action committees (PAC) at the discretion of their respective managements.

These committees will be empowered to collect political contributions from company paychecks, in accordance with the preferance of individual employees.

An estimated 17,000 Bell System employees at the district management level and above will be eligible to participate in the voluntary program, according to an AT&T spokesman. Employees at the "E Level," or those making about $25,000 per year and over, also will be eligible.

Like United Fund

Administrative machinery for setting up the PACs will be handled by the operating companies in much the same way that funds are now collected for United Fund drives and other charities, according to an AT&T spokesman.

In cases where employees do not instruct that contributions be donated to specific candidates, the PAC will determine which candidate is to receive the funds, the spokesman said.

Two operating companies, Pacific Northwest Bell and Ohio Bell, are now setting up PACs and other units of the Bell System will probably consider similar actions, although participation is not mandatory, the spokesman noted.

AT&T itself is expected to have a PAC in operation later this year, he said.

Initially the PACs will be aimed at national political parties and candidates for federal office. But support for state and local candidates could also be forthcoming where permitted by state law.

Two Problem Areas

An expert on election practices said two possible problem areas could arise with the AT&T policy. First, by virtue of AT&T's monopoly position, its PAC-collected funds could exert an unusual impact on an election simply because of the company's number of employees and market position.

Secondly, if employee contributions are not kept strictly confidential, members of management could exert pressure on an employee to contribute funds to a candidate favored by management, the expert said.

An AT&T spokesman denied this would be a problem, saying information about contributions would be known only to the employee and members of the PAC. Further, solicitations for funds would be made by "equal level" employees so an employee would not be put in the position of having to respond to a request for funds from a superior, he said.

Administrative and clerical costs of the PACs will be "identified separately and not used for ratemaking," the spokesman said.

Each PAC will be broken down into three subcommittees. The administrative committee would solicit the funds from fellow workers; the finance committee would be responsible for accounting and recordkeeping; and the dispersal committee would be responsible for contributing the funds.

In a letter to Bell operating companies, deButts said the PACs "provide a workable and honorable political fund-raising tool to support our democratic electoral process."

Contest for Hobbyists

NEW HAVEN, Conn. – A five-year membership is the prize in a name-the-users'-group contest sponsored by computer hobbyists exchanging information on the use of Heathkits.

The more obvious choices are ruled out because Heath Co. objects to use of their trademarks by an independent organization.

Entries and requests for further information should be sent to Charles A. Floto, Apt. 10, 267 Willow St., New Haven, Conn. 06511.

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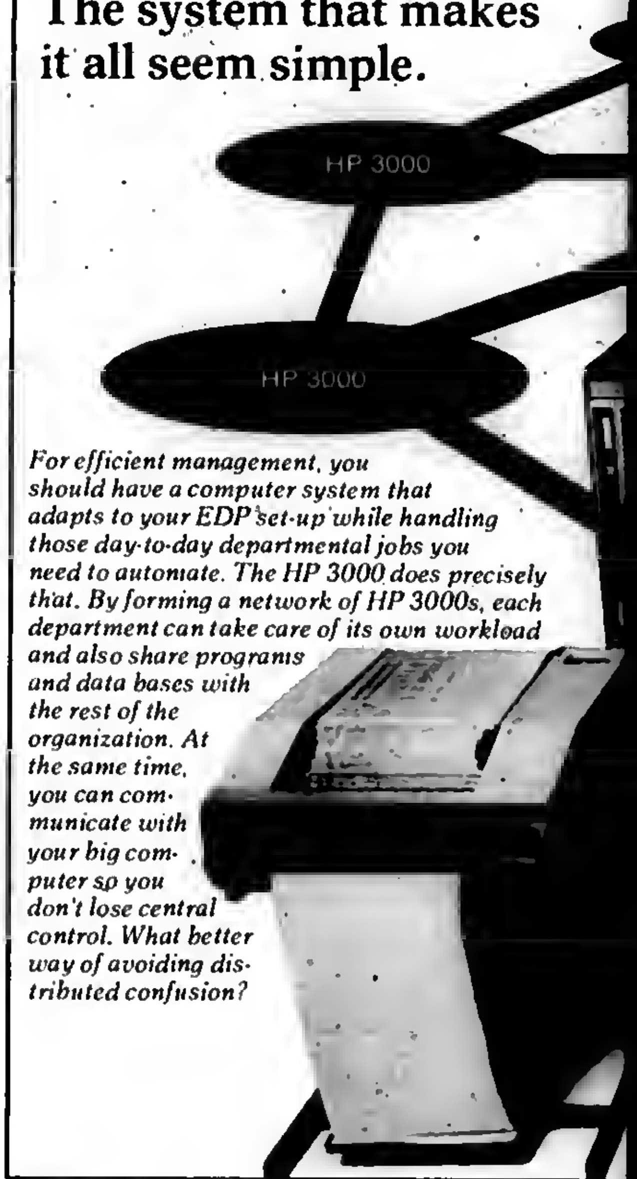

For efficient management, you should have a computer system that adapts to your EDP set-up while handling those day-to-day departmental jobs you need to automate. The HP 3000 does precisely that. By forming a network of HP 3000s, each department can take care of its own workload and also share programs and data bases with the rest of the organization. At the same time, you can communicate with your big computer so you don't lose central control. What better way of avoiding distributed confusion?

47703HPG5

Hessians' Privacy Abused Despite Law

Special to Computerworld

WIESBADEN, Germany — The Hessian Data Protection Law, now six years old and the first of its kind, is being rewritten to conform with a new federal statute set to go into effect here next year.

Although this will be a major challenge, according to Dr. Spiros Simitis, Hessian data protection commissioner, it will not overshadow enforcement of the present law.

In his sixth annual report, Simitis cited a number of cases which show that despite six years' experience with the law, "public administration" does not always give it the necessary thought and priority.

The following incidents have occurred recently:

- Illicit communication of personal data of insurance agents, damaging the careers of persons involved.
- Insufficient observation of data protection regulations when studies were conducted by a research group.
- Acquisition of sensitive personal data in a town clerk's office by auxiliary personnel not bound to secrecy.
- Passing out-of-date DP printouts with citizen registration data to a nursery school as drawing paper.
- Communication of citizen's personal data to private firms without prior consent.

Simitis has submitted a model draft law to the Hessian parliament that he believes will serve to unify the state and federal legislation.

Swiss Data Law Merges Privacy, Security Concerns

By G. Russell Pipe
Special to Computerworld

GENEVA, Switzerland — The Swiss are legislating to protect "computer-processed data," supplementing already strict requirements on disclosure or foreign transmissions of trade and business data.

The emphasis is on security and confidentiality of data in automated systems, rather than privacy involving rights of access and control of personal records.

Three cantons, Basel, Geneva and Argovie, have taken initiatives at their own level while the Federal Council, or cabinet, is discussing the desirability and constitutionality of a national privacy law.

Geneva's "Law on Protection of Computer-Processed Data" recently came into force. It couples statutes suppressing access to public and commercial records, especially banking information, with comprehensive DP security/-confidentiality rules covering data on individuals and legal persons which are maintained by any public authority.

The legislation specifically requires that:

- The files, data and results covered be established, transmitted and stored in such a manner that they cannot be consulted, altered, extracted or destroyed by any unauthorized person.
- The Council of State decides, on a case-by-case basis, to what extent the services of the canton and community administrations and those of the institutions established under public law can consult or extract files, data and results. To this end an enforcement order will be established.
- The Council of State may authorize the creation of data banks and information systems affecting several services or administrations.

Security Stressed

A blanket rule of secrecy is imposed on DP personnel. The law specifies that "persons entrusted with preparation, transmittal, storage and processing of data are pledged to secrecy; in particular they have no right to communicate to, or make available to, other real or legal persons, or to other public services, the information obtained in the exercise of their duties, unless authorized or obliged to do so under the present law or its enforcement order."

A State Computer Information Control Committee composed of five members will be named to:

- Ensure the statutory and legal provisions concerning the confidential handling of information and files are strictly observed during operations.
- Render opinions on proper disclosures of data in certain cases.
- Give judgments on the complaints made by persons who believe that certain data files contain errors or are used for improper purposes and that their rights have been violated.
- Submit annually, or more often when necessary, a report to the Council of State.

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So if you want to take the confusion out of distributed processing, now and in the years ahead, call your nearest Hewlett-Packard office listed in the White Pages. Ask for a Computer Systems representative. Or write for more information to Bill Krause, Hewlett-Packard, 11000 Wolfe Road, Dept. 304, Cupertino CA 95014.

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Own Programming Business

Prison Inmates Find DP Pays Off Both Inside and Out

By Ann Dooley
Of the CW Staff

STILLWATER, Minn. — The DPers at Stillwater Data Processing Systems, Inc. (SDPS) enjoy their new trade and look forward to continuing in DP when they get outside.

For them, "outside" means the other side of the Stillwater State Prison walls.

Nearly all the DP staff are prison inmates who work for SDPS, a privately owned company, that was set up under the Minnesota Department of Corrections' private industry program.

The program is an attempt to rehabilitate prisoners and provide them with skills and training which they can use when they get out of prison.

Employees of SDPS receive up to $4.62 an hour for an eight-hour work day compared with an average inmate's top wage of $1.75 an hour. A lead programmer recently earned $1,042 in one month. Employees also receive liability insurance and workman's compensation.

Wages, which are comparable to those on the outside, enable the inmates to pay the prison for room and board — up to $120 a month. They are also able to help support their families, make restitution and save money for when they get out of the prison.

"The $100 'gate money' just isn't enough," according to Stanley Wood, private industry program director.

"We try to make it as much like the outside world as possible, with the same expenses," he added. "We are even trying to see if employees can qualify for unemployment benefits."

Competes With Outside Firms

Another reason for paying comparable wages is that the company contracts with outside businesses and SDPS's competitors could file claims of unfair competition against the prison.

In addition to paying wages, the year-old company pays all operating costs including rent for facilities from the state. Revenue for the month of April was just over $7,000 and it has been increasing each month. Although the company has not yet been able to meet its monthly operating costs of $7,700, it expects to do so by the end of the year — one year sooner than originally anticipated, Wood said.

SDPS also operates with loans from the Bush Foundation, which gave it $38,000; the Bremer Foundation, which will give $17,000 over a three-year period; and the Minneapolis Foundation, which is guaranteeing a $38,000 bank loan, pegged to 1.5% more than the prime rate. The loans are to be repaid from earnings.

An inmate-owned business such as SDPS is one of the first of its kind, according to Wood, since private industry within prison has not been allowed for many years. In the past, prisoners were often used as a source of slave labor to make license plates or other mass-production items. As these conditions became known to the public, private industry was banned from prisons.

SDPS does any kind of custom programming such as payroll, inventory, accounts receivable or sales analysis. It operates by remote job entry on-line to the client's computer from two terminals and a keypunch machine located at the prison.

The firm plans to install a computer on site within the next year which would enable it to go into time-sharing, Wood said.

Variety of Customers

Its customers include the state department of administration, Hennepin County, the University of Minnesota, Northern States Power Co., General Mills and Blue Cross-Blue Shield of Minnesota.

"We go out and solicit business and if we can do the work for them at a cost-effective rate, we'll do it," according to William Ward, president, marketing representative and one of the few noninmates in the company. "If I didn't think we were delivering, I'd say the whole concept was a bunch of B.S.," he said.

"That's not to say we're opposed to addressing sociological matters along the way if we can. But we must deliver a quality product at a competitive price," James Willman, operations manager, said.

Clients don't seem to be overly concerned with any possible security leak or computer misuse, Wood said. The employee inmates take an oath that no information will be divulged. In addition, operations are designed so employees work only on their assigned program and don't have access to any other information from the CPU at the client's site, he explained.

The staff includes six inmate DP employees supervised by Willman, who is also an inmate. Their number is scheduled to increase to 18 by next fall, Wood said. The six staff members and Willman are occasionally helped by a college intern and by Ward, who does the marketing.

At first, few minority inmates were applying, Wood said. But the company has adopted an affirmative action program and is making a push to encourage blacks, Indians and other minorities to upgrade their skills and get over the fear of failing, which is a primary problem, according to Wood.

Trainees take courses provided by the state of Minnesota and then receive in-service training through the company, of "a quality equal to any vocational program," Wood said.

Most of the trainees and employees would like to stay in DP. Donald Gray, formerly a drafting trainee, said one reason he likes computers better is because he earns three dollars an hour.

"It's a much better opportunity than turning out twine. I figure I'll be able to save about $10,000 if I'm here another two to three years," he said.

Willman also feels he will stay in computers when he leaves prison. He has been able to save $16,000 and to help support his family while working as manager for the company.

The large difference in wages between this and other prison employment under the private industry program has not caused any jealousy in the other inmates, employees said.

It seems to give the others hope to "see a program working for a change instead of dying on the vine as so many ideas there do," one worker said.

The company pays released employees a salary for six weeks after they leave prison. Often, they are hired immediately by a firm they did programming for while they were in prison, Wood said.

When hiring or choosing trainees, Ward doesn't look into the inmates' conviction or prison record, he said. "We're not concerned about what the individual is here for. We're interested in his present and future."

Several area computer firms loaned experts to the prison to help set up the company. SDPS's board of directors consists of executives from Control Data Corp., Honeywell Information Systems, Burroughs, Fabritec, Blue Cross-Blue Shield and General Mills as well as Willman and Ward.

DP Enters Realm of Stitchery

SOUTHFIELD, Mich. — Computerpoint, Inc. here has begun to offer custom needlepoint patterns on canvas enabling needlepointers to recreate a picture of their choice in stitchery.

Martin Berustein, vice-president of the firm, declined for competitive reasons to provide any details on his company's techniques, but he claimed that proprietary software developed by his firm enables a computer to make a pattern duplicating a picture that calls for colors of yarn selected from as many as 900 shades.

As many as 10 tints of one hue may be used to produce realistic results, giving lifelike dimensions to a picture or portrait. Individuals who have ordered custom patterns from the firm furnish artwork that "runs that gamut of American life," he commented. Many people want to have pictures of their deceased children reproduced, he said.

The needlepoint artwork is available in kit form, called the Picture Perfect Needlepoint Kit, and includes the computer-generated pattern, instructions, needlepoint ruler, canvas and Persian wool yarn.

Currently marketing the kit in test areas, the company is expanding its marketing across the country.

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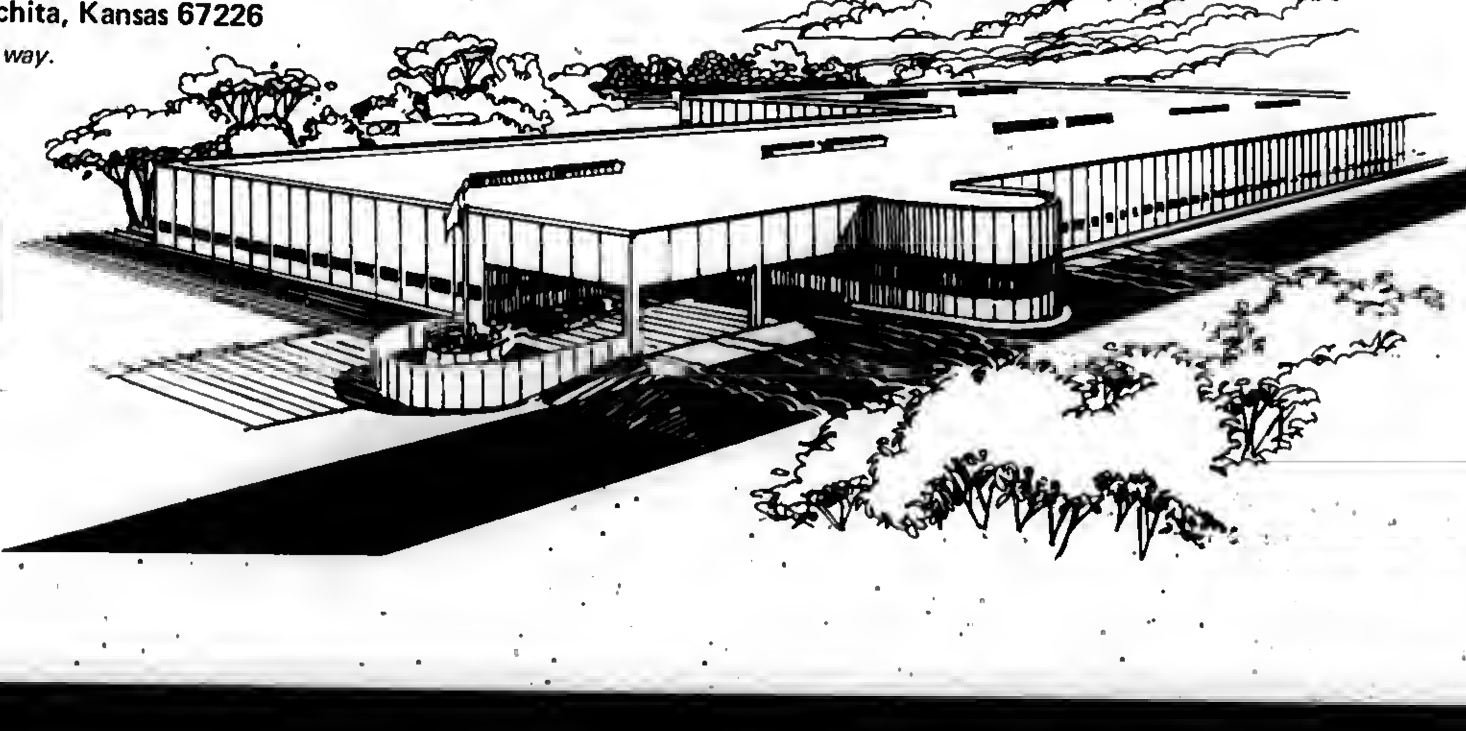

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Editorials

Illumination by Blackout

The increasing reliance of modern American society on computer systems was clearly illustrated during the recent power blackout in New York City and Westchester County [CW, July 18].

The effects of a blackout such as the one experienced in New York would, of course, be catastrophic whether or not there was a reliance on computers. But the increased reliance on computers — as well as other electrical "tools" or appliances — heightened the scope of disaster.

Consider the following, for example:

- Banks would not have been able to conduct business if they had reopened in the daylight hours. Without access to their computers, there was no way of knowing — quickly — such things as account balances.
- Hotels could not tell if travelers arriving in the city during the crisis had reservations. In many cases the computers were down and there were no hard-copy lists of people expected.
- Airlines — even in airports like Newark, which kept operating — often could not tell if passengers had reservations since they were tied into computers through switches in the affected area.
- In several hotels which have installed electronic door locks controlled by computers, the rooms were automatically locked and people who struggled up flights of stairs to reach them could not get in.

All of these things were minor inconveniences when compared with the massive problems that faced New York during the blackout.

But as society increasingly relies on computer systems, the effects of power outages and the like is sure to grow.

A Boon for All

The Office of Management and Budget is planning to review how the government procures and uses computer systems as part of President Carter's reorganization program [CW, July 11].

This is welcome news.

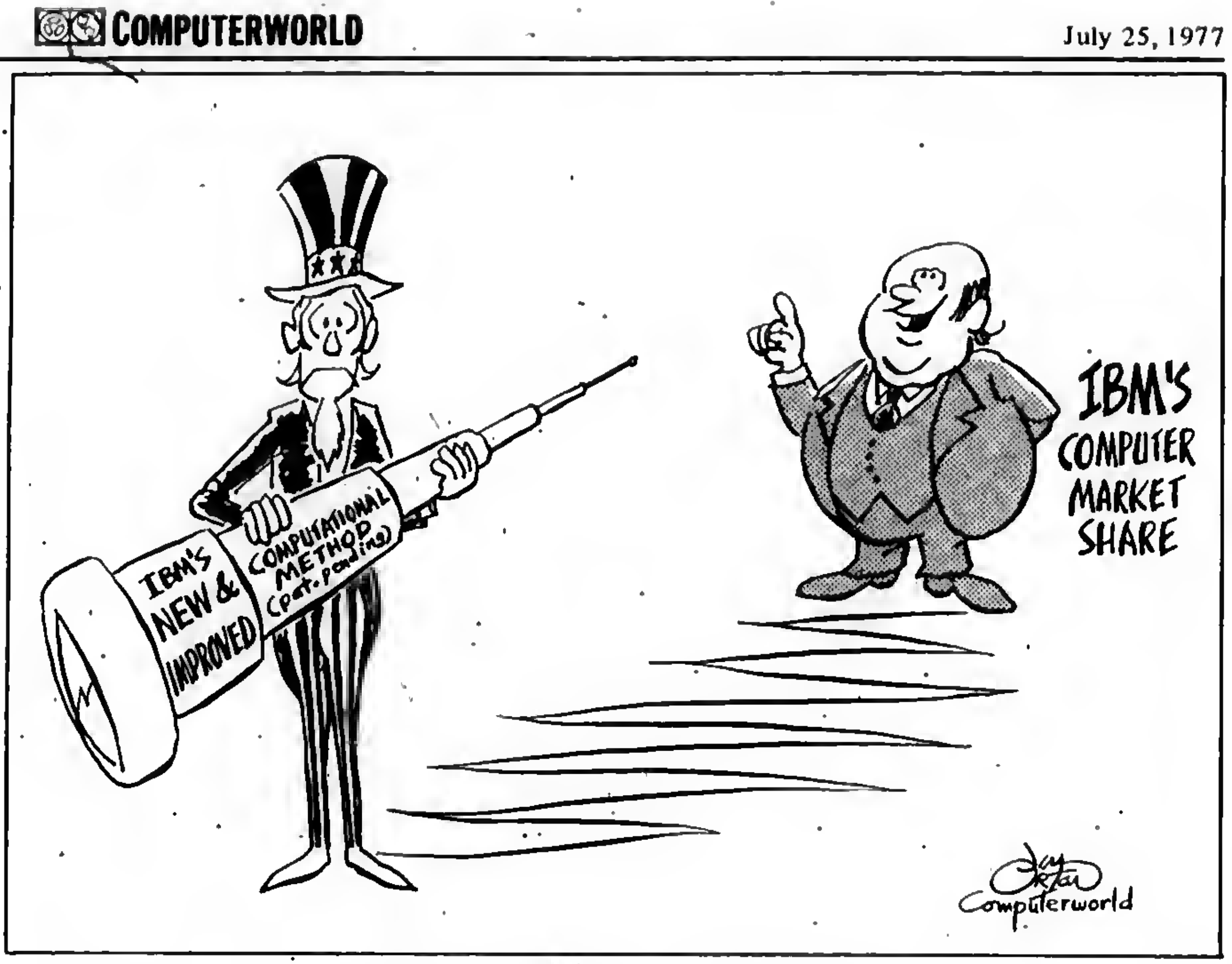
The executive branch of the government is the largest computer user in the world. While many of its systems are used for rather esoteric tasks such as intelligence monitoring and spacecraft control, there are also many applications similar to those of the average business user.

Because of this, the promised study could be beneficial in two ways.

First, any reduction in inefficient use of computers would help keep the cost of government down while, at the same time, providing increased services to the taxpayer. More efficient computer use could be a step toward the goal of making government more efficient, and more efficient government would benefit everyone.

Secondly, techniques learned by the government in improving the efficiency of its enormous computer investment may have direct implications for private-sector users. By identifying areas of inefficiency and developing ways to overcome them, the government could point the way for private enterprise to overcome its own inefficiencies in computer use.

It's a program worth the effort and worth monitoring.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Letters to the Editor

Ribicoff Bill Could Be Vehicle For Protecting DP's Innovators

There is a strong link between the two editorials in your issue of July 11.

First, I was very impressed with John Hersey's testimony. The man's brilliance is evident even in fields other than his own. I agree with the proposition in the last paragraph of the lead editorial, which suggested that some new way be found to protect creators and innovators.

The Ribicoff bill also answers a new problem in a new way (in the old days, we could not fit a 100K program into a 10K machine, either). Why not use the Ribicoff bill as a vehicle to develop protection for the innovators.

Peter F. Gundell

New York, N.Y.

Unfortunate Choice of Example

I must take issue with one of the assumptions in your editorial of July 11 endorsing the Ribicoff bill. The comparison of embezzling to armed robbery ignores the fact that the armed robber threatens the lives of the persons robbed.

It would be more reasonable to compare computer crime to grand theft, in which large amounts may be stolen, but without immediate threat to the life of the victim.

The implicit assumption that property is at least as important as human lives is precisely the attitude that has alienated a significant portion of the American populace from what it sees as an insensitive corporate society.

I hope this was merely a poorly chosen example and not an indication of your basic philosophy.

Darrell G. Tangman

Minneapolis, Minn.

It was a poorly chosen example. Ed.

A Job That Needs Doing

It is with bewilderment that I continue to read letters such as the one from T.C. Bartz, headlined "NCC Showed Interest in Certification Low" [CW, July 11].

His conclusion, based on the low number of attendees at the Institute for Certification of Computer Professionals (ICCP) sessions, was that "interest" rather than "necessity" is the mother of invention. The DP practitioners indeed may not be interested in certification, but they sure as hell need it.

Certification coupled with codes of ethics, conduct and good practice, as well as curriculum, accreditation, self-assessment and continuing education, is the basis for a much-needed DP "profession" to protect the public from poor practice.

ICCP is working on just that — a profession. If people like Bartz aren't interested in necessity, we regret it. We hope they change their minds, but we can't wait for them to get interested.

To paraphrase what Donn Parker said at NCC and recently printed in CW regarding the issue of ethics, we in DP have had only 25 years to do what the other professions took hundreds of years to do. But we have a job to do and we need to do it before "something" is legislated independent of our DP constituent societies.

J.J. Martin
Public Information Chairman

ICCP
Chicago, Ill.

Another Rave for 'Waves'

I am enjoying immensely the excerpts from *The Waves of Change* by Charles P. Lecht in the last several issues of *Computerworld*. This type of publication in your newspaper reflects well on the *Computerworld* image and enhances your professionalism.

I will certainly purchase Lecht's book when it becomes available and I hope CW will follow with additional book excerpts of the same caliber.

Thomas F. Meurer

Wellesley, Mass.

(Other letters on Page 20.)

Data Past

Five Years Ago
July 26, 1972

MONTVALE, N.J. — This year marked the end of the Spring and Fall Joint Computer Conferences. In 1973 they were combined into one national show — the National Computer Conference and Exposition.

— — —

SAN FRANCISCO — The first IBM 360/30 with 256K was installed in the San Francisco Data Center of Greyhound Computer Corp. by Computer Hardware Consultants & Services. In a test comparing the 256K Model 30 against a 256K Model 40 on a series of heavily CPU-bound compiles, Greyhound found "the job took only 18 minutes with the 256K 30 as compared with 14.5 minutes on the 40," the center's general manager said.

Eight Years Ago
July 30, 1969

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Human Skills Needed

Experts Explain Ways to Improve DP Teams' Output

By Jack Stone
Special to Computerworld

A growing but generally unpublicized movement toward understanding and improving the processes of building effective work teams in DP centers is under way.

The issue is briefly stated as follows: The typical formal DP organization is built upon the hierarchy of the manager and the managed, the supervisor and the supervised. Further, for proper control, technical personnel are coded into specialist slots — programmers · program and analysts analyze.

Yet most significant projects involve the formation of ad hoc task forces or project groups that somehow must solve DP problems that cannot be solved by the established organization or by individuals working alone.

One major reason why many such projects fail is that the people suddenly thrust into the team environment are not certain how they should operate in that milieu or how the team itself should operate. The solution to effective teaming, therefore, is dependent upon the host of factors involved in human communications, including the full gamut of human behavior and human needs characteristics, a skills area notably lacking in our industry.

William J. Frost and Carol M. Vaughan of the U.S. General Services Administration are key members of a current national effort to study how DP teams and work groups can be structured and operated to increase individual fulfillment and improve organizational efficiency and effectiveness. (They will be reporting on their work at the annual conference of the Association for Computing Machinery Special Interest Group on Computer Personnel Research in Washington next month, a meeting which promises to be the best one of its kind in years.)

Here are the highlights of the first part of my interview with them.

Q: Just what does team building mean?

Vaughan: Team building (or team development, which is perhaps a more acceptable term) is a set of strategies designed to improve results from an organization by creating an atmosphere of confidence and coordination through first developing consistency in what people want and what the organization needs. Second, it establishes a better climate of working together.

Q: Doesn't the project manager already try to accomplish these goals?

Frost: Well, the typical DP project manager has the responsibility, but he usually takes an authoritarian approach. He distributes work, provides methods and techniques, and expects the supervised to produce on his timetable. What results is that the typical team member is turned off by the project organization and loses incentive to produce. He turns out a minimally acceptable product which, when added to the output of other frustrated team members, results in project failure.

Peter Peterson recently wrote, "While many have said there is a danger that the computer will begin to think like men, a much greater danger is that men might begin to think like computers." One of the major problems in computer centers today is that too many DP supervisors act like machines and fail to apply the human understanding necessary to get DPers to work together.

Q: I hope you aren't suggesting the typical DP project manager should have a B.A. degree in behavioral psychology.

Frost: Oh, no! But the manager needs to have an understanding of and some training in the implementation of processes which help individuals change their attitudes and work for the team instead of themselves. Success in DP is sorely contingent upon the successful development of the project team, because it is only the effective, viable team that captures the creativity of employees at all levels of the organization.

It helps develop a problem-solving attitude on the part of team members and builds problem-solving actions into the work process. The effective team — one that really accomplishes its mission to the complete satisfaction of its members — has closely aligned the psychological needs of its members to the needs of the organization. It is the model of intraorganizational communications.

The Human Connection

Vaughan: You see, the major role of the DP department should be to assist in the creative decision-making process, based upon the free exchange of ideas and concepts. Then it should help translate these thoughts into practical and efficient automated systems. Creativity is simply not an activity which is directed, but is the result of open and unimpeded investigation and discussion among team members. We strongly feel that team success depends on creativity, that creativity comes from a democratic environment and that the authoritarian work group will in the long run almost assuredly lead to poor performance.

Q: It seems to me the project manager has to be a Renaissance man to accomplish the goals you set forth.

Vaughan: Well, it may seem so, but actually it's not too bad. We have identified five disciplines involved in the development of a DP team: planning, logic, systems, human behavior and human needs. Individually, the planner says, "You have to know where you are before you can decide how to get where you want to go." The logician says, "If you want to solve problems, you should begin with the thinking process."

The systems analyst says, "What is needed is a plan that brings each subsystem up to standard in the specified time to allow the entire developmental effort to work effectively." The behaviorial scientist says, "After the basic physiological, sociological and psychological needs are met, people will seek self-actualization."

Q: How do you put all of this together?

Frost: The basic principle of team development is that the team is used to effect change in the individuals' attitudes and style of behavior. All of the team members must assemble as a functioning group and together examine the behavior of each team member. Specifically, the team must examine the present attitudes and styles of the members; the effects of these attitudes and styles on the team as an entity and on the output of the team; and the choice and impact of alternative styles and attitudes.

For success in this endeavor, the entire group must recognize several things; conflict of ideas is a necessary step in the change process; attitudes must be developed and maintained to support a creative environment; and change is not uniform or consistent, but can be achieved only over long periods of time with persistent effort.

This interview will be concluded in next week's column, which describes the Frost/-Vaughan approach to DP team development.

Letters on topics related to the human connection with DP systems can be addressed to Stone at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Unprecedented 'Test'

Blackout Shows Lack of Network Contingency Plans

The recent New York blackout, which suddenly isolated some 10 million people, provided a test of computerized systems in practical operation which was unprecedented in scope. The 1965 blackout gave no comparable test of modern-day computer usage, its prime result being simply the closing down of many mainframes where power, air conditioning and elevators were down.

The Taylor Report

By

Alan Taylor, CDP

Networks, although some were operational, were not nearly as important as they are now, and few complaints regarding their operation were voiced.

In fact, few complaints regarding the operation of computer networks were heard during the recent blackout. But this seems to be because of the lack of understanding as to their role in some of the difficulties of the situation or because of apathy.

Perhaps the worst example of poor network operations came from the airlines. The New York area has three airports — La Guardia and Kennedy in the city and Newark in New Jersey. Newark has a separate power supplier. A number of airlines, including TWA, have centralized their reservation systems so someone in Newark wanting to reserve a flight leaving from Newark has to go through Manhattan — even when Newark is operational and Manhattan is not.

When the blackout was three hours old and it was known that it would last until after 8 a.m. the next morning, I was faced with the job of getting to Boston from Newark. I knew — from American Airlines — that the planes after 8 a.m. from Newark were sold out, but there were two flights at about 7 a.m. on Eastern and TWA. These, American told me, were available.

But trying to book them — that was the rub. I did and was told by TWA that because its Manhattan terminals were down nothing could be booked until after power returned (that was after the plane took off).

This, the airline told me, was the situation with all the airlines that had (so American said) moved their Newark reservations to Manhattan.

American was a recent exception to the rule, I was told when I reported to American my prior call. If American would let me reserve seats on TWA — which it might or might not — then fine. But TWA itself could do nothing.

American could do something and did, for which many thanks. But where were TWA's "terminal down" contingency plans? Do they exist? If not, why not?

Half Better Than None

TWA and, presumably, the other airlines were not really down. Its Manhattan office was not really isolated. TWA could communicate with the outside world with its own computers simply through the use of telephones — by calling American, if necessary. More likely, it could call TWA in Philadelphia or Washington. Then reservations could be given and confirmed.

The procedure would be slower than normal, but the airline would certainly be able to cope with bookings for planes flying during the blackout. Half a working system is better than none, but nothing was offered. That was the size of the failure.

Hotel networks faltered just as much when the terminals dropped power. The Sheraton and the Holiday Inn (and presumably others) had rooms, but they stopped booking them even though the mayor and others were urging everyone to stay put. (This was in the La Guardia area, too). Excuse: The computer (i.e., the terminal) was down.

The hotel network is not the same as the airline network case. Here we are dealing with the loss of control of immediately needed local resources rather than the lack of access to a remote central computer. If TWA's central system had gone down, no one would have been able to confirm our reservations, so central's being up was essential.

But in the case of hotels, it really didn't matter whether the central computer was down. What was needed was responsible local control of local resources.

Again, what was needed was a terminal-down contingency plan taking into account possible and entirely foreseeable requirements for the optimal use of those resources. But at least an hour into the blackout no such optimizing operation was in progress. Again, why not?

Con Ed Responsibility

Yet, with all the problems of the networks, the real blame for the network failures must go to Con Ed. As Mayor Abraham Beame said later, Con Ed's story had been that the lesson of the 1965 blackout was learned and Con Ed would not get knocked out again.

Yet, some time before the blackout, it knew that total crash was possible. It may have known months or even years earlier. Con Ed even took action . . . but it told no one.

Computerized networks and other users of Con Ed supplies are entitled to some information so they can bring their contigency plans into operation.

Nor were these the only affected terminal/network systems. Banking terminals and credit terminals were only some of the other public service systems that must have been affected. How did they react? How can they be improved?

Perhaps we need a power-cut emergency wire service like the one that passed the news of the American helicoper shot down in North Korea into New York television shows during the blackout. Computer sites could determine in advance whether to pay for such a signal as a precaution and then could make their contingency plans accordingly.

We certainly need something. If we take the opportunity to learn the lessons of the New York blackout of 1977, then we will be much more ready in 1980 to face power problems anywhere in the world.

Here's hoping. As usual, your suggestions as to suitable ways to get something done will be appreciated.

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Hersey Argument Against DP Copyrights Exclusionary

Reader Commentary

By Calvin N. Mooers
Special to Computerworld

In regard to *Computerworld*'s recent editorial [CW, July 11] on author John Hersey's dissenting view on copyrights for computer programs, [CW, July 4], the first question we must address is whether there should be legal protection for computer software.

Hersey and most others are in the affirmative, but he objects to the use of copyright. He proposes a new manner of protection in a draft "Computer Software Protection Act" complete with provisions for instituting legal suits for recovery of damages and for injunctive relief.

Hersey's legislative proposal is so close to copyright in its essentials that he appears to be urging a redundant statute. We don't need duplication of the laws.

Hersey believes allowing copyrights for computer software writings (programs) will somehow cause a "pollution" (his word) of other copyrighted writings of an artistic or literary kind. Software is different and polluting, according to his argument, because it can be used with or to control machines.

He holds that software in a computer is a "mechanical process" or actually a "machine." This is bad because, in his words, "a definite danger to the quality of life comes with a blurring and merging of human and mechanical communication." Also, "it goes to the distinction between human beings and machines."

Hersey therefore wishes to reserve copyrights for artistic works — arts, books and music. (He overlooks the possible polluting effects of the present widespread use of copyrights for commercial advertisements, inflatable plastic Santa Clauses, junk jewelry, tables of math functions, etc,) He wishes to exclude from copyright writings which can be used with one particular mechanical device — the computer.

Cannot his exclusionary argument about mechanical pollution be applied to books which are prepared for publication by linotype or computer typesetter, rather than by hand with a quill pen?

Can't it also be applied to plays mechanically transmitted and presented by television? Or to art in the form of color photography?

What of ordinary typeset books which will soon be used to control reading machines for the blind?

Would Hersey forego copyright to one of his future novels merely becaue he composed it while using a desktop typewriter with an internal microcomputer with editing and correction facilities? What about books which will be published solely through the medium of a publicly accessible data base?

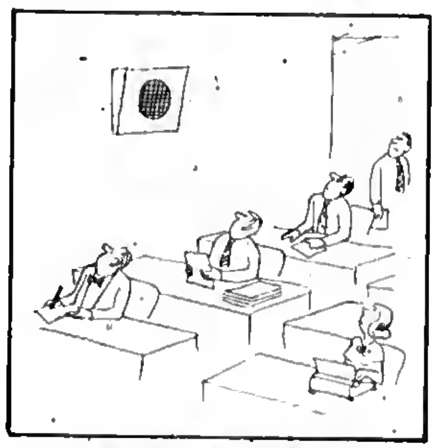
Only a little imagination is needed to show that Hersey's proposal, if acted upon, would create many future years of legal overlap, confusion and mischief.

Congress was quite clear as to its intent regarding computer programs during the legislation of the new copyright law. The committee reports of both the Senate and the House of Representatives said:

"With respect to the copyrightability of computer programs, the ownership of copyrights in them, the term of protection and the formal requirements of the remainder of the bill, the new statute would apply."

Amen.

Mooers is with Rockford Research, Inc. in Cambridge, Mass.



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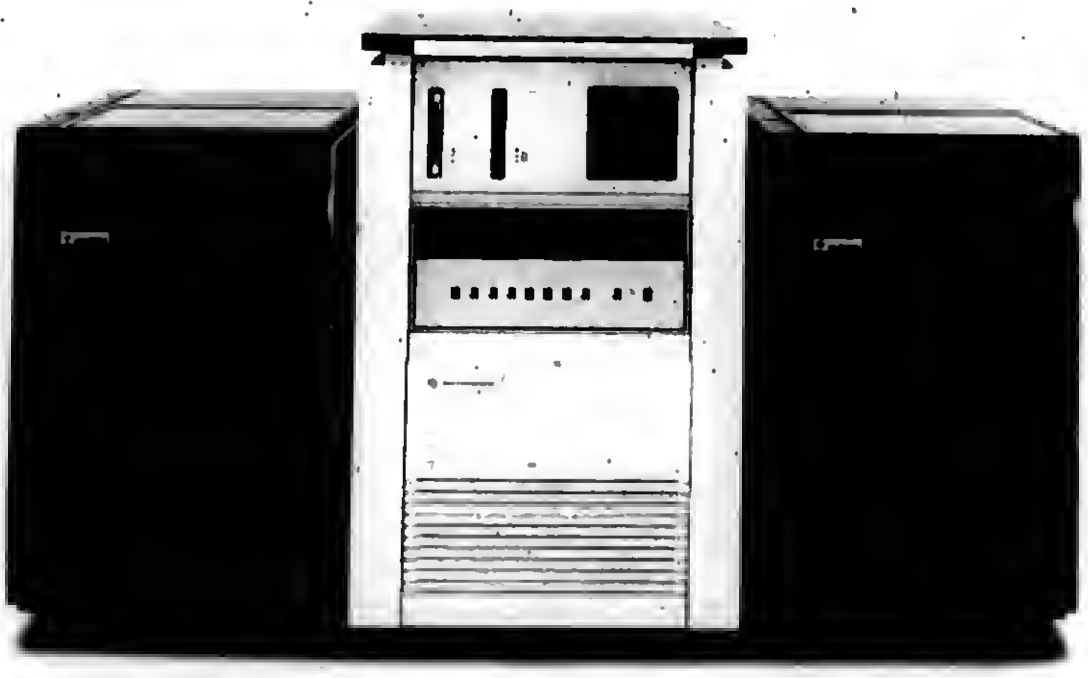

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For Effective Software Management

Structured Programming Valuable for Its Discipline

By Bruee E. Spiro
Of the CW Staff

There have been, as Gopal Kapur reminded us in "Conflict Over Structured Methodology Goes On . . ." [CW, June 6], many articles on the subject. A good number of these have come from the scholars and teachers associated with software development, as they properly should.

We should not overlook, however, the more practical aspects of the implementation of any form of discipline in the software development and maintenance area.

In our organization, with some 75 analysts/programmers, we implemented structured programming about a year and a half ago. We made an early decision *not* to evaluate different ways, but rather to go with what we understood the best.

Whether it was the particular articles, books and letters we had read or not, we quickly gravitated to the Harlan Mills approach. We have been most happy with the results.

The biggest differences we have noticed are a greatly increased visibility; much better user/analyst/programmer relationships and understanding; and a more comfortable feeling that we know what is going on. These are not quantifiable, we have no "before" and "after" figures about productivity, correctness, etc.

For us, this has not been an experiment to be evaluated; it has been a management action taken to correct problems perceived by management. We count it a successful one.

First Real Discipline

No doubt there is long-range benefit in establishing the best methodology. More important to the practicing manager is the simple existence of discipline. As has been said, structured programming is not the absence of GOTOs; it is the presence of structure.

Whether it is chief programmer, Chapin charts, Hipo documentation or what have you, the structured methodology is the first real discipline that has come to our art. There are many confusing and often meaningless buzzwords, attracted by a not-too-well-defined process like software development. We need to look beyond this layer of smoke and put the effective and useful pieces to work for us.

As with all aspects of management, there is a highly personal element. What works for one individual or one group will not necessarily work for another. Theory X, Theory Y, Matrix and the others have been both successes and failures. We should know about them and then set up our own style that will work with our people and our environment, within the constraints that are known to exist.

So it is with structure in software development. It is essential that effective management proceed with what is useful without waiting for the ultimate answers.

Structured programming discipline can help. It will not cure all of the ills, nor will it be the last step to be taken. Like the systems we work on, management of software development is an evolving process that builds on past experience and must continue to take advantage of new and better ways to do things.

Managerial, Not Technical

The first thing is the recognition that the use of structured discipline is more of a management problem than a technical one. In this regard, the specific techniques used are not the thing; the use of a discipline is.

The hidden meaning of generalized status reporting gives way to specific, definable points that are indicators of progress when they are a part of an overall discipline. For example, the successful test of a single module has little meaning by itself, but as a sequential element in a top-down structure it is as much an indication of progress as a yard maker on a football field.

The key point is that a complete discipline must be used. Structured coding – the presence or absence of GOTOs – may be intellectually satisfying, but will not be of significant value to timely, accurate cost-effective product delivery unless it is a part of a cradle-to-grave discipline.

Make no mistake, structured coding is a powerful technique and may well be the foundation upon which a disciplined approach can be built. But it is only a part. The most powerful engine will not even move a car if the gear box doesn't work. Even worse, without a steering wheel, it may be best if the car is not able to move at all.

The complete discipline must start with customer interface. Call it pidgin English if you will, but formal grammar combined with standard formats such as Hipo charts can be a significant element in obtaining user understanding of what the systems developer intends to do. It can therefore be an essential part of the early isolation of misconceptions and design errors.

It has been our experience that use of these techniques has significantly reduced the need for reprogramming immediately after implementation because "this is not what I wanted."

Adding Detail

Using refinements, or a series of levels, of formal grammar, it is possible to add the detail needed for programming without destroying the initial meaning. This provides a program specification that accurately represents the mutually agreed-upon design.

The conventions of structured programming then supply the discipline that make a computer program a man-readable document. Properly executed, the listing produced reads like a book. No jumping from Page 37 to Page 9 for a couple of words in the middle of a sentence; no change in the meaning of a sentence by moving punctuation around or inserting different words.

We did not eliminate the GOTO; we found it is a useful device if it is clear why it is used and what purpose it serves.

In turn, the readability of the program makes the walk-through work. The problems sometimes attributed to the walk-through can be traced to the fact that the program itself can not be read easily by all of the participants.

When this happens, the basic problem of program readability must be solved before results can be expected from the walk-through.

The implementation of a structured discipline in a functionining software shop is not a simple thing. It should be undertaken with clear objectives, full management support and a high threshold of frustration.

There will be initial reluctance, and there will still be problems after the implementatioo is complete. First pass concepts and directions may have to be changed to fit individual circumstances.

Structured methodologies will not change the quality of the people; it takes good people to make any methodology work.

Structured discipline will, however, make the entire development process more visible to users, developers and managers. It will assist in the early isolation of design flaws. It will provide information for the recognition of schedule slippage at an early date.

In short, the discipline of the structured methods represent valuable tools and techniques that should be understood by all of us who are concerned with software development. They should be used as essential parts of responsible software management.

Spiro is chief of ADPE Systems, Management and Requirements Office, in the Defense Communications Agency Operations Center, Washington, D.C.

Reader Commentary

Top-down development really proves its worth in the testing process. Properly done, a top-down test provides a highly visible gauge of progress and an assurance that effective testing is being done.

"Properly done," is the key phrase. A sloppy structured program is no better than a sloppy unstructured program.

There is no guarantee of "goodness" in this or any other discipline, whether applied to computer software or not. The process of software development is a complex and difficult endeavor.

High-quality people are needed and knowledgeable management is essential. With these ingredients, a structured approach, well thought out and forcefully employed, can be of tremendous value.

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Letters to the Editor

A Public Challenge to Rigo

Must Certificate in Data Processing (CDP) holders continue to ~~be subjected~~ to the verbal abuses of Joe Rigo taking a slight-of-hand slap at the certificate?

So what if Donn Parker got research monies to deal with programmers' ethics [CW, June 13]? At least he's dealing with the problem. He may not deal with it as others might, but one cannot for a minute diminish the value of Parker or his work to this industry.

So what if Jean Sammet felt the CDP was for others — or if, for that matter, the whole Association for Computing Machinery feels the CDP is for others? Did it ever occur to Rigo that they may defer because they are unable to pass the exam?

Only they know the answer to that question.

Now it's my turn. Parker and Sammet notwithstanding, I issue to Rigo a public challenge to take and pass the 1978 CDP exam — on me.

I will place on deposit with *Computerworld* a certified check for $100, payable to Rigo, and deliverable upon his showing evidence of satisfactory completion of all sections of the 1978 exam.

But wait, there's more. I shall also place on deposit with CW a second check in the same amount — this one payable to Institute for Certification of Computer Professionals (ICCP).

If Rigo is successful and I lose, ICCP will have my donation, specifically stipulated to defray the expenses of administering the exam to some worthy handicapped DPer.

But it's conditional. Rigo must deposit with CW a like sum, to be held in escrow for the same purpose should be not be successful.

If be is not successful, the price of his failure will be the $200, plus one brief article to be published by CW giving an honest evaluation of the exam and extolling its virtues.

If he is successful, perhaps he'll then have a different view.

Either way, it's time for Rigo to put his money where his pen is.

Kenniston W. Lord Jr.
Hudson, Mass.

More on 'Audit Computers'

Frankly, I am stumped by the story in the July 14 issue entitled "Audit Computers Seen 'Freeing' Auditors in Future." The majority of the text deals with the usual DP horror stories that always come up whenever DP auditors get together.

Obviously, Donn Parker thought the concept of an "audit computer" would stir up some interest.

As a matter of fact, it did, and I would like to see a follow-up story which would cover the concept in greater detail.

Fred H. Francis
New Orleans, La.

Comments on Degree Debate

In regard to Jack Stone's column in the July 4 issue, I most heartily agree with Regina Litman's comments concerning the college degree requirement of some organizations.

To me, the most unfortunate thing about this type of discrimination is not only the disservice done to the individual, but the disservice done by the hiring organization to itself and the industry.

Those DP types who work in organizations small enough to do their own recruiting and hiring know the dedicated, capable, enthusiastic trainee or professional is a rare person indeed. To me, it is inexcusable to refuse to consider such a person for lack of a piece of paper which may or may not mean anything.

Please do not let me give the impression that I do not believe a college education is valuable. Four years of education in the proper disciplines is of great value.

I also believe that years of successful experience in the real world can be of considerably more value than a diploma.

Cliff Fryda
Watertown, S.D.

No Assembler in CCP Exam

The Institute for Certification of Computer Professionals (ICCP) is very appreciative of the coverage *Computerworld* gave of our panels at NCC. However, there was a serious error in "ICCPers See Tests Best for Self-Examination" [CW, June 27].

The second to last paragraph concerning the use of IBM's Assembler is exactly opposite of true. In spite of IBM's share of the market, the Certificate in Computer Programming (CCP) does not include IBM's Assembler language in those questions that have to do with low-level programming.

In fact, no specific vendor's assembler language is used in the CCP examinations.

Philip J. Gensler
Secretary
ICCP
Chicago, Ill.

what, me?
a fiduciary?

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WANG

Programming Called Wasteful

Most Runs Have Short Useful Life, Research Indicates

By Don Leavitt
Of the CW Staff

CHICAGO – Programmer productivity is a management issue more than a technical problem, and substantial amounts of programming within an installation, even using modern techniques, may be a waste of time.

In fact, management can do more by managing what is programmed, in the conventional sense, rather than managing how it is programmed, according to R.C. Kendall and E.C. Lamb of IBM's Information Systems DP Technical Planning staff here.

In a paper on Program Usage Studies distributed at the May meeting of Guide, the IBMers urged readers to reduce programming of low-usage programs, to reduce programming of short-lived programs and to use substitute methods instead of conventional programming.

Especially with respect to application programs, "install it first, program it last," they said. Most programs have a reason for being, so they should be produced, they said, but the reason is often so short-lived that a great deal of effort cannot be justified on the typical application program.

Eight Test Sites

The initial study on which the paper was based was slated to last five months. Data was gathered at eight test sites and much of it seemed to be just about what was expected; the top 10 and 20 programs in each of the shops accounted for very nearly the same amount of the total load.

When the researchers came back five months later, the percentages were just about the same, but 40% of the programs from the original lists were no longer in use. They had, effectively, died.

Two further extensions, each lasting four months, showed a comparable death rate for programs that had been among the most actively used ones when the first measure was taken. And a long-term study of a single site seemed to confirm the pattern, they said.

Ultimately, Kendall and Lamb documented what they called the churning and instability of the typical installation. There is, they saw, a high rate of development and a high "infant mortality" among programs.

An installation's program load typically has a death rate of 7% a month and the average program has a life expectancy of 14 months, they concluded.

More than that, the team found that most CPU load comes from a few programs which run frequently, but most programs do not have any effect on the load. The efficiency of application programs is clearly not a factor in total load, they added, and tuning such programs is "generally a waste of resources."

Programs typically are small, with only 4% having greater than 2,000 lines of source code and 50% having fewer than 400 lines of code.

The small size had some very definite implications in design approach and programming management, they warned. How, for example, can improved programming technologies, design reviews, code inspections and the like be applied to numerous small programs?

The small size also leads to "unitized functions" with embedded data descriptions and dependencies, they said, adding that characteristically that meant change was difficult – and dropping a program altogether might be more sensible than trying to fix it as conditions change.

Since the match of programming language to problem is "random" at best, the power of a high-level language vs. Assembler typically slips to "somewhat better than 2 to 1," rather than the usually expected figures of anywhere from 4 to 10 to 1, they added.

Just as clearly, RPG-like languages, data retrieval and inquiry facilities that can get a problem solved quickly – regardless of how efficient the solution might be technically – got tacit endorsements from the two researchers.

'Iris' Update Backs Reorganization, Use Of Nova Partitions

IRVINE, Calif. – The Interactive Real-Time Information System (Iris) software for Data General Corp. Novas and Nova-type minicomputers has been enhanced by Educational Data Systems, Inc. (EDSI). Iris 7.2 allows the user to set the size and number of partitions to be allocated, a spokeswoman noted.

There is nothing in the operating system to limit the number of partitions or the number of terminals that can be used, she claimed. Total memory size would be a limiting factor on the number of partitions; the type of multiplexer, the key to the number of terminals that could be supported, she explained.

The software allows a number of terminals handling the same task to access the same file. Provision is also made to support dynamic scheduling of low-priority tasks to ensure that all users receive service within a specified time interval, she added..

Iris has been redesigned for easier updating, she said. All Basic programs under the 7.2 version are position-independent, permitting the user to make system changes without having to dump the system onto a mag tape or disk.

The Iris supervisor requires 16K and the system can be used with minicomputers having 64K to 128K of main memory. Iris costs $2,800 in single units, but requires a business Basic system from EDSI – for another $800 – to be immediately useable. Other software for "Asgol," edit routines and Assembler-level coding are also available, the company said from 1682 Langley Ave., Irvine, Calif. 92714.

'Poor Man's TSO' Has Features Of IBM Software at Lower Cost

PORTLAND, Ore. – OTS from JLB Systems is sometimes referred to as a "poor man's TSO," according to a user, because it supports many of the facilities of IBM's Time Sharing Option, but with much lower system resource requirements.

Operationally, OTS is a multitasking extension of IBM's Operating System which uses common teleprocessing techniques to achieve good response time and efficient computer utilization, a vendor spokesman claimed.

Its purpose is to increase the productivity of the application programming staff, the systems programmers and the operations control function. It is even used occasionally by non-DP people for data entry, he noted.

The software provides a full screen editing, internal reader job submission, data set and catalog management and print file viewing. It also backs a limited command language, dynamic data set allocation and operator communication, he said.

It is, according to the spokesman, an efficient and comprehensive program development tool that allows "in context" editing of source programs, JCL manuals and documentation using local or remote 3270 terminals and operating under OS and VS systems.

The efficiency is such that the software can function with a minimum of 55K whereas IBM's TSO requires "something like 200K." OTS also functions with 3% to 5% fewer CPU cycles than TSO, he said.

Increased productivity is achieved through faster test turnaround, higher quality maintenance and just plain better control over programs and documentation, he added.

The system includes an interface to The Librarian from Applied Data Research, Inc. and this linkage apparently could be extended to other library systems.

OTS can be acquired for a one-time cost of $5,000 or $250/mo from the vendor at 3930 S.W. Kanan, Portland, Ore. 97221.

Billing System Set to Monitor PDP-11s Running Under RSTS/E

BOSTON – A job accounting and billing system for the Digital Equipment Corp. PDP-11 under version 6A or 6B of the RSTS/E operating system is now available from Mark/Ops.

The system is based on "snapshots" it takes of users who are attached, on-line to the minicomputer. The package collects such data as collect time, CPU time, language in use, program name in use, peripherals assigned to a job, job number and keyboard number, according to the vendor.

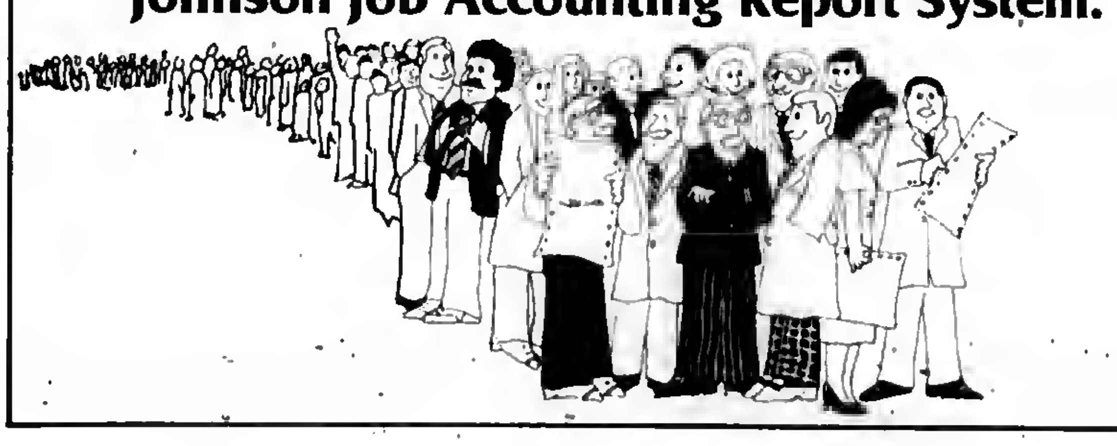
An additional feature is a Mark/Ops modification of the DEC-supplied "LOGIN" utility. This allows the user a session identifier which appears chronologically and as a subtotal on a monthly bill, the spokesman noted.

The billing system also collects storage use, by day, and reports it. Beyond that, there is a facility to use all the data collected for a range of management reports keyed to system utilization, he said.

The billing data is taken at six-minute intervals and reduced at the end of the day. A rate structure varying with time of day and day of the week is possible, the company added.

Users appear to be protected against bad billing with this system. A recovery procedure "assures" billing data capture even after a system crash. Systems in which crashes occurred are captured and flagged on the user bills, the spokesman noted.

The package cost depends on whether the user is commercial or educational and on the number of copies ordered, Mark/Ops said from 475 Commonwealth Ave., Boston, Mass. 02115.



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Data Administrator Encompasses Functions of DBA

By Stephen L. Robinson
Special to Computerworld

Data Base Corner

Much has been written about the management of data base systems. The sources of such literature span the spectrum from business school academics to system programmers, from managers of management information systems to DP directors, from vice-presidents to analysts.

Out of all this frequently contradictory literature, we shall endeavor to distill an essence of sanity.

As with any subject, tracking the evolution of today's terminology may be useful in clarifying the problem. The development of a data base system requires not only a recognition of the true nature and scope of the objective system, but the creation of a team of management and technical personnel to plan and monitor the transition process.

In the early days (four or more years ago) of data base, it was fashionable to talk about a single individual, usually called a data base administrator (DBA), who would control the entire effort. The DBA concept was not only implemented in many organizations, it was preached by virtually all of the active data base consultants and lecturers (yours truly among the group).

This "oberfuhrer" system got a real workout in the cold, hard business world. After several years of field trials, the concept was found wanting. Too few supermen/superwomen could be found who could juggle a complete data base system environment.

Indeed, there seems to be a question whether one person, no matter how super, can manage all of the activities.

The original concept of data base administration spanned technical and executive skill areas; tactical and strategic planning, computer and noncomputer problems. Many DBAs, recognizing the problems they faced, were instrumental in creating a position of assistant DBA within their own data base adminstration group.

The DBA retained the executive and strategic responsibilities for the data base system while the assistant DBA absorbed the tactical and technical responsibilties. This division follows rather closely a distinction, suggested several years ago, between a data administrator and a data base administrator.

Terminology being what it is, the mapping is as confusing as possible; the term "data administrator" corresponds to the executive and srategic aspects of the old DBA designation, while the term "data base administrator" corresponds to the technical and tactical aspects of the old DBA designation.

Since data base systems are an evolving phenomena, the management of such systems is still changing. As more organizations try different management structures, we will learn more about how a data base system can best be managed.

In the interim, we present the following thumbnail sketches of data base administrator and data administrator. In future "Data Base Corners" we will discuss major tasks of these two offices in greater detail.

Data Base Administrator

The DBA is responsible for the physical well being of that part of the data base which is stored on a computer. The DBA therefore possess the combined skills of a system/programmer/analyst and a computer analyst.

He should ideally have had a major role in the selection of a data base package, teleprocessing package and a data dictionary package. (It is recognized that in many organizations some of the aforementioned selections would fall under the aegis of an existing systems group.)

The DBA, in conjuntion with computer center management, will establish the configuration for data base processing (e.g. for batch, message, etc.). The DBA staff will be responsible for the security and integrity of the data base and the data base package.

The DBA group designs both schemas and subschemas (physical and logical data bases) and serves as consultant to application programmers and analysts on the proper use of the data base system.

In summary, this is a technical office, devoted to the day-by-day aspects of the data base operation as well as the planning for technical expansion and enchancement. This group has minimal involvement with end users.

Data Administration

Data is a corporate resource. It is expensive to gather, maintain, organize and use.

Heretofore most organizations have derived minimal return from their investment in data. As noted in earlier articles, this is primarily due to the file system philosophy of data organization.

Under this philosophy data elements "belong" to an application rather than possessing, as an attribute, those applications which require it.

The data administration group is responsible for inverting the sense of present file systems and creating a true data base system. The major tasks of data administration are:

- Documenting and analyzing existing data systems.
- Assessing data and information requirements.
- Developing a model of the organization's data.
- Planning for the sharing of data.
- Developing new data entry procedures, forms, etc.
- Working with "users" who require information.

Note that data administration involves many noncomputer-related aspects of DP. This group should not be confused with a management information system group, which is primarily concerned with using the data base to develop models and reports for the benefit of management decision making.

Clearly these have been only brief outlines of the two functions to merely identify the characteristics of the areas. In future columns we will address each area in some detail.

The intent of the forthcoming columns will not be to set down absolute job descriptions, but to present the state of evolution in various organizations.

Copyright Stephen L. Robinson, 1977. Letters related to data base concepts or techniques can be addressed to Robinson at CACI-Commercial, 75 Rockefeller Plaza, New York, N.Y. 10019.

Lecht to Speak in L.A.

CHICAGO — Charles P. Lecht, author of *The Waves of Change*, will be the keynote speaker at a two-day conference for DP trainers sponsored by Advanced Systems, Inc. (ASI) in late September at the Marriott Hotel here.

Workshops covering a range of subjects will also be part of the program, a spokesman noted.

For those registering in advance of the Sept. 26-27 meeting, the cost is $80, but registrations at the conference itself (for $95), "are also welcome," he said from ASI offices at 1601 Tonne Road, Elk Grove Village, Ill. 60007.

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Syncsort vs. 5740 Release 3

User Picks Independent Sort Based on IBM-Run Tests

By Don Leavitt
Of the CW Staff

SALEM, Ore. – Benchmarking a software product – actually running it to see how well it does against expectations or against the performance of a functionally comparable product – has long been recognized as one of the better screening techniques. And lately a number of installations around the country have been using benchmarks to assess different sort systems.

The choices differ depending on the user's system and needs, but large-scale IBM shops now have a choice that includes at least IBM's older sorts, its latest – Release 3 of the 5740-SM1 product – and Whitlow Computer's Syncsort.

There have been reports of a number of Release 3-Syncsort confrontations ever since the IBM product was introduced earlier this year [CW, April 11]. One of the most unusual of these exercises was run here at the Oregon Department of Transportation data center in May.

The details of the test results were substantial enough so that the department's software specialist, Dewayne Theissen, sent them along to management when he requested permission to purchase Syncsort. But the results were not the high point of the tests, in his view; the way the tests were run was equally significant to Theissen.

He laughed when he was asked whether it was someone from his organization or from Whitlow that had run the tests. "Neither," he said, "it was our IBM system engineer [SE] . . . Now there's an objective source for an evaluation."

Representative Mix

The tests took place largely because the department had reached a point where it felt it needed a better sort than it had. Six different state agencies use the department's 370/158 with 3M bytes of memory, running under OS/VS.

The SE was asked to run tests comparing Syncsort – which Theissen and others had read about – with the sort then in use. The results were very favorable to the Whitlow product, but then Theissen heard about the updated version of IBM's 5740 sort, and he felt he had to give it a try.

So he asked the IBM technician to run parallel sorts using Syncsort and the 5740 Release 3.

The sorts were a representative mix of the department's workload, he said. There were about 16 different files to be sorted and the SE set them up in different ways, at different times of the day and on different days of the week to be sure neither package had an advantage by accident of when it was run.

Generally working with a 128K sort region, the SE set up short, mid-range and long sort tasks. Most of the records were fixed-length format, although variable records were also in some of the tests.

Some of the records were 30 bytes long; others had 2,000 or more bytes. And volumes were equally diverse. Some of the jobs involved only 3,000 to 4,000 records; others ranged up to 3 million to 4 million, Theissen said.

'Tremendous' Improvement

Even though he had no specific data on what improvement the Whitlow sort provided, even compared with IBM's Release 3, the department's spokesman characterized the improvement as "just tremendous" and leading to cutbacks in both wall clock time and CPU time.

The comparative stability of the product also impressed Theissen. He said the IBM SE couldn't use the Release 3 package he brought with him for the tests. It wouldn't run until he made several "fixes" to the basic coding.

Theissen was also impressed with the way Syncsort compensated for "trivial" operator errors – a slight mistake in the job control statements, for example – and kept going, whereas "Release 3 just plain bombed" when faced with the same flaws.

Release 3 proved a vast improvement over the department's earlier sort, Theissen said. The IBM update beat Syncsort twice, he recalled, but Syncsort topped the performance of the IBM release 13 times.

"When you got right down to it, almost regardless of what the SE did to get Release 3 in a good light, Syncsort outperformed it." And the IBMer admitted it after a while, Theissen said.

Metro Access Grows On GE Mark III Net

ROCKVILLE, Md. – General Electric (GE) has expanded the Metro Access capability of its Mark III remote computing network both geographically and in services available.

For the past year, Metro Access services have been available in New York, Chicago, Los Angeles, Cleveland and Washington, D.C. As of July 1, the services became available in Boston, Atlanta, Dallas, Schenectady, N.Y. and San Francisco.

Previously, Metro Access supported 1,200 bit/sec full-duplex service, 4,800 bit/sec service and GE's telephone information processing service based on input from tone-type telephones, all linked into Mark III data centers.

The services have been expanded to also support 110- and 300 bit/sec service, a recently introduced data entry mode service and 2,400 bit/sec service in each of the 10 metropolitan areas now covered.

Headquarters for the Mark III network is at 401 N. Washington, Rockville, Md. 20850.

Pansophic Cuts Prices

OAK BROOK, Ill. – Pansophic Systems, Inc. has slashed the prices of its software products for installations using low-order IBM 360 and 370 CPUs.

This policy brings Panvalet, for example, down to $2,980 instead of the full cost of $4,980, a spokesman noted.

Pansophic is at 709 Enterprise Drive, Oak Brook, Ill. 60521.

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Ketron Selling MPS III For Linear Programming

ARLINGTON, Va. — MPS III, a mathematical programming system designed for use with applications involving large or complex linear programming (LP) models and associated data bases, is now available from Ketron, Inc.

Previously supported by Management Science Systems, Inc., the software is packaged for in-house use on large-scale IBM or Amdahl CPUs and is available as a service on various remote computing networks, including General Electric's Mark III, National CSS and McDonnell Douglas Automation facilities, according to a spokesman.

The basic system includes control and standard LP optimizer capabilities. Options include Dataform, a data management subsystem developed specifically for management science problems. It supports matrix generation, solution analysis and report writing.

Other options include Whizard, which solves LP models entirely within main or virtual storage; GUB, a generalized upper bounding facility that solves certain classes of LP models; and Lockbox, a facility location optimizer, the spokesman said.

Another option, Mistic, is said to solve mixed-integer models while Quad resolves quadratic problems.

Written in BAL, the basic system is available under a paid-up license for $6,000. Dataform costs an additional $24,000; Whizard, $13,500; GUB, $22,000; and Mistic, $6,000.

Monthly leases are also available, Ketron noted from the 12th floor of the Architect Building, 1400 Wilson Blvd., Arlington, Va. 22209.

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ISE Sets Meet

SAN FRANCISCO — The first national conference of the Institute for Software Engineering (ISE) will be held Aug. 10-12 at the Del Webb Towne House here, according to the meeting's general chairman, Ed Prichard.

The conference program will range from reports of "very specific achievements" in capacity management using software physics to more general presentations exploring various aspects of software engineering, Prichard said.

Although the conference is geared to the interests of institute organizations and most of the papers will come from these groups, the meeting is open to anyone interested in the general subject area and the program will include a number of papers from nonmembers, Prichard noted.

Registration fees — $85 for ISE members and $135 for others — cover session attendance, a copy of the conference record and a ticket to the conference luncheon.

Other information is available from Don Madden at the institute, P.O. Box 637, Palo Alto, Calif. 94302.

'X2C' Features Enhanced

FAIRFIELD, N.J. — Capabilities added to X2C, the data management system on the Rapidata, Inc. remote computing network, enable users to create complex structured data bases through "simple, English-language" instructions, according to the vendor.

The modifications provide users with more direct access to DBMS-10, the data base management system running on the firm's Decsystem-10s. The standard X2C syntax defines all data relationships required to set up a Codasyl-type hierarchical or network data base, a spokeswoman noted.

Updating and data maintenance capabilities, also added to X2C, make it possible to interactively add or modify information in an existing data base, she added. If large numbers of updates are to be done, however, they can now be batched.

String manipulation functions — another range of enhancements — include facilities for concatenating and dissecting strings, pattern matching, character location, justification, blank-trimming and character set replacement.

Rapidata expects these functions to be used for interactive command parsing and easier selective data retrieval, she explained.

Charges for using X2C are based on the network's standard resource usage costs. Off-peak or batch processing can be used to cut updating and report costs, she said from Rapidata's offices at 20 New Dutch Lane, Fairfield, N.J. 07006.

SDS Adds Data Bases

SANTA MONICA, Calif. — Two data bases have been added to those already available through the computerized retrieval service offered by System Development Corp. (SDC), adding access to almost 50,000 recently published articles, journals and books on business and management.

Users working with their own terminals can reach the data bases, called Accountants Index and Management Contents, by local dial-up phone connection to the SDC center, a spokeswoman noted.

Compiled by the American Institute of Certified Public Accountants, the Accountants Index includes material published since January 1976 and covers such areas as accounting, auditing, data processing, financial reporting, taxation and investments, she said.

Management Contents, produced by Management Information Services, provides access to articles published since September 1974.

The company is at 2500 Colorado Ave., Santa Monica, Calif. 90406.

Composer Linkage Grows

PLAINVIEW, N.Y. — Software is now available for the Varicomposer I to permit its use with Linofilm Europa and Domestic ACM-9000 as well as other phototypesetters, according to Varisystems Corp.

The composing and editing system, built around Varisystems' own 32K minicomputer, can perform four different functions simultaneously including disk I/O, hyphenation, justification and editing and, "if required," hard-copy printout, a spokesman said.

Using software to interface with various systems eliminates keyboard changes. The "soft" approach also supports forward and backward scrolling through the floppy disk-based file to check or change copy before it reaches the phototypesetter, he said.

Data on the Varicomposer I and the new Linofilm and ACM-9000 programs is available from Shefra Graphics Ltd., AG Slough, England, or from the Marketing Department, Varisystems Corp., 80 Skyline Drive, Plainview, N.Y. 11803.

Deltak Course Trains Trainers

SCHILLER PARK, Ill. — Designed for individuals at DP installations who will be responsible for guiding others taking Deltak courses, "Learning Reinforcement: Tutoring" is a two-part multimedia course that requires two and a half to three hours of study.

Concepts in this particular course have some value for those dealing with materials from other audiovisual vendors, but it is primarily keyed to approaches described in guides to Deltak's own subject matter courses.

"Learning Reinforcement: Tutoring" is available through the company's Resource 12 library rental program or can be purchased separately, Deltak noted from 9950 West Lawrence Ave., Schiller Park, Ill. 60176.

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COMMUNICATIONS

A Distributed Processing Necessity

Source Data Entry Pushing Terminals Into Mainstream

By Stephen Robinson
Special to Computerworld

The evolution toward distributed data processing (DDP) is resulting in greater integration of the terminal business into the mainstream of the DP industry. That integration is based on a single fundamental concept — source data entry (SDE).

DDP is based on the concept of establishing processing elements of an appropriate size at the best locations for any particular organization. SDE simply implies providing user-oriented input/output elements to the people within an organization who create the data to be processed.

The benefits of SDE are derived from the opportunity it provides to create a "dialogue" betwen the element (in this case, a terminal) doing the machine encoding and the person who created, and therefore understands, the data being collected.

For each added step between the creator of the data and its encoding, the error rate increases and the cost of detecting and correcting the errors rises proportionately. Avoiding these errors and costs has driven users first from traditional data entry methods such as the keypunch and later from key-to-disk media devices (tape, disk, diskette, cassette), where the entry of data is separated physically from both the source and the computer, toward greater use of SDE techniques.

Key to Success

The key to success in implementing SDE systems lies in the ease with which the operator, with minimal training, can interact with the terminal.

Two basic principles govern any SDE situation. The source (operator) must be able to confirm that the terminal correctly encoded and labeled the data entered. The terminal must ensure that the data was entered in proper form by executing a series of tests for the type of data expected.

Any errors detected can be corrected immediately because the creator of the data — the operator — is present. Those familiar with the situation in which data is received from a source — for instance, a person on the telephone — and then encoded in a separate step will recognize the importance of this seemingly simple improvement.

These principles must be implemented in a way that conforms conveniently to the user's way of doing business and enhances his efficiency. The system must be flexible enough to adapt to the user's specific requirements — not the other way around.

Operator/terminal interaction usually comes under the control of programmers in a DDP environment. User organizations ultimately determine the quality of this interaction either by selecting vendor-provided features or by creating additional controls (access methods, formats, procedures and checks) that are tailored to the particular data being collected.

In the marketplace this has led to demand for systems with more local programming and communications capabilities — in other words, intelligent terminals and specialized software.

Range of Options

Many vendors currently are moving to provide distributed systems terminals. These include:

- Intelligent terminal vendors.
- Key-to-disk (-tape, -cassette, -diskette) manufacturers.
- Interactive terminal vendors.
- Minicomputer manufacturers.
- Batch-oriented remote job entry.
- System houses.
- Mainframe manufacturers.

The problem for the user is to select a vendor whose products and expertise best match those required for his particular implementation scheme and one that offers flexibility for tailoring to his applications.

In the last decade, industry- or application-specific terminals were designed for very specialized uses. This specialization forced both the user and the vendor to amortize the development costs over a limited number of units.

Recent years have seen a move to microprocessor-based terminals in which most customization can be accomplished via the microprocessor software. Such terminals are significantly more flexible and adaptable.

However, changes in their function still require either vendor assistance or sophisticated users with staffs capable of microprogramming. Other drawbacks with microprogramming are the lack of higher level languages and the limited power of the microprocessor.

The minicomputer-hased terminal, on the other hand, can be adapted for use in specific industries, such as airlines, banks, manufacturing and hospitals, with software written in Cobol, Fortran or other standard languages. This type of terminal is very flexible, since it can run a variety of programs concurrently and can also be used as a general minicomputer to process local applications.

DP departments are showing increasing concern for the effectiveness of their solutions as they begin to implement systems that interact directly with higher levels of their management. These departments no longer enjoy the old security blanket of being the exclusive link between their computers and top management.

With greater dependence on terminals by persons who are not DP specialists, reliability and ease of use become more critical. Lack of these qualities is magnified in situations where the users are highly visible to their own customers — nurses, bank tellers, manufacturers' or distributors' representatives or clerks at checkout counters, for example.

SDE also provides a ready solution to the administrative problems of today's "consumer revolution" because terminals permit data entry while the data source (the consumer) remains available, in person or on the telephone, for corrections during the process.

The emphasis will not remain on the technological differences hetween various products used to collect data. The 1980s will see even greater movement toward market-driven products where functionality and flexibility will be of prime importance.

And data entry will be seen not as an adjunct to the DP arena, but as a key element of it.

Robinsan is manager far market planning/-terminals, Honeywell Informatian Systems, Inc.

For T/S Applications

HP Unveils Four-Color, Compact Graphics Plotter

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a four-color, portable graphic plotter for use in time-sharing applications.

HP 7221A Four-Color Plotter

The Model 7221A features RS-232C compatibility and plugs into a terminal. The plotter bed is 11- by 17 in.

A microprocessor that is also used in the HP 9825 calculator drives the stepper motor and optimizes the use of communications, according to the firm.

The unit has a built-in buffer memory of 1,150 characters expandable to 3,086; internal alphanumeric character, arc and circle generation: and user-defined dashed line patterns.

Up to 64 macro instructions can be stored at one time, the firm said.

Like the company's Model 9872 plotter, the 7221A selects the appropriate pen from a bank rather than carrying them on the arm.

Transmission rate is switch-selectable from 75 to 2,400 bit/sec. The 7221A features parity control and half- or full-duplex mode.

The unit can be operated in local mode, writing characters typed on the terminal keyboard. Upper and lower case printing is available.

Self-Test Diagnostics

The 7221A has a self-test feature which runs diagnostics without the aid of a computer and which pinpoints the fault in over 90% of instances, enabling a user to tell HP what part is needed, a spokesman claimed.

The test feature takes about 500 words out of the micro's 6K operating system, he said.

The internal character generator contains six fonts and the 2.5mm-character plotting speed is typically 3 char./sec, according to the firm.

A single command defines a circle in either direction and angles of rotation can be specified to up to .06 degrees resolution. Plot resolution is programmable to .025mm, according to the firm.

The stepping motor is controlled to .008mm at full pen speed of 36 cm/sec, the spokesman added.

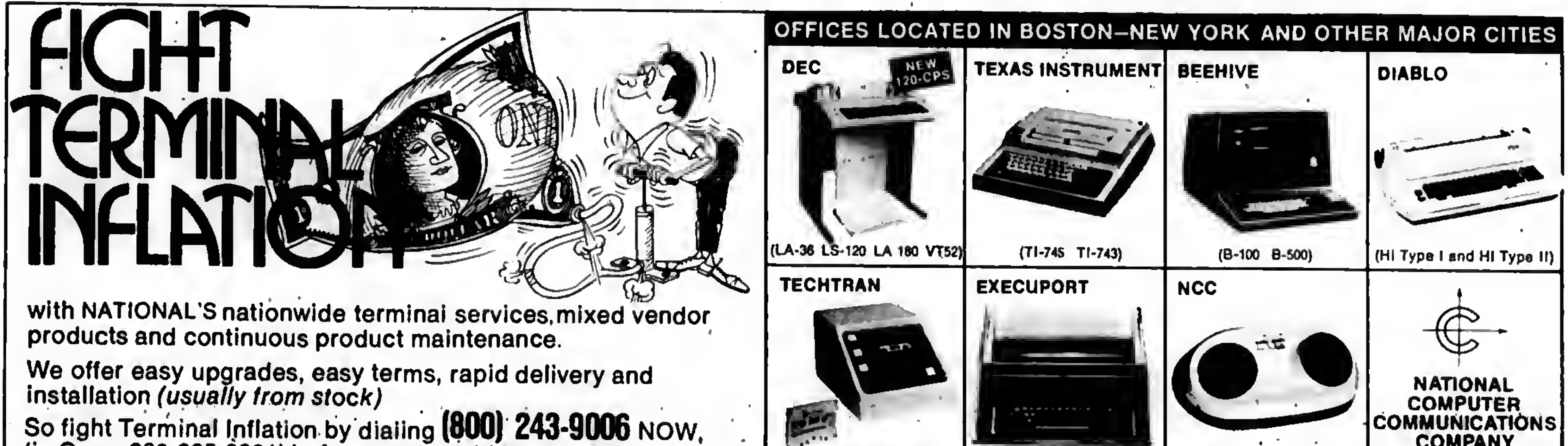
Software Library

A library of 80 Fortran subroutines is available for HP 1000 and 3000 series computers, of which 52 are accessible to users. About five of these are similar to those used with incremental plotters, the spokesman said. The HP Plot 21 package sells for $50.

The library is also available on the General Electric Mark III time-sharing network and will be available on others also, HP said.

The plotter costs $4,600; it is priced at $4,825 with an expanded data buffer. The unit is manufactured by the San Diego Division, a member of HP's Instrument Group.

Delivery will start in August, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.



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Distributed System Relieves Tellers' Writing Burden

READING, Pa. — Tellers at the Conrail/Amtrak Federal Credit Union have written neither checks nor receipts since the installation early this year of a distributed DP system that utilizes communications printing terminals.

The system links Conrail's main office here and a branch in Philadelphia with dual IBM 370/168s at the central data center in King of Prussia. It is leased and serviced by Comteck, Inc., a subsidiary of Shared Medical Systems.

Conrail/Amtrak's system is a far cry from the batch processing system they used previously. Until the installation of the present system early this year, tellers would bundle the day's paperwork and ship it to King of Prussia, where Comteck would process it that night.

"Not only is this a thing of the past, but we can now key in a loan in Reading and have it displayed on a CRT or printed by a printer terminal in our Philadelphia branch office," according to Conrail/Amtrak's assistant treasurer, Hiester Haeseler.

"It was a big step for us. From a manual operation where every check and receipt was typed by hand, we've gone to one where the teller enters a transaction, pushes a single key and the check is imprinted automatically," Haeseler said.

The Comteck credit union system is a distributed DP service which involves the shared use of the duplexed 370/168s and either in-house or shared use of Digital Equipment Corp. PDP-11/70s used as transaction processing systems.

Terminal Transactions

The DEC machines have 256K bytes of memory and disks containing 88M bytes of additional memory. The 11/70s communicate through DEC PDP-11/34s under a binary synchronous protocol through dedicated leased lines to the 370 CPUs.

Conrail/Amtrak and other credit unions tie into the DEC minicomputers located in-house or regional centers operated by Comteck.

A total of six Perkin-Elmer Data Systems Carousel 350 printing terminals located at the center here and in Philadelphia communicate asynchronously to the distributed minicomputers at 1,200 bit/sec over dedicated lines through modems assembled by Shared Medical Systems.

The imprinting of checks as well as receipts for credit union members is performed on the 350 terminals. In addition, loans can also be displayed on Beehive Medical Electronics, Inc. B100 CRTs, located at the other office, Haeseler said.

Because the printer has a split platen, checks fed on a continuous roll can be imprinted on one side while receipts are fed into the other.

To do the same job as fast without the split-platen printer terminal, Conrail would need two printers in each office, Haeseler said.

A model 310 Carousel is also used by the credit union for back-office work where documents are not required, he added.

First on System

The Conrail/Amtrak Federal Credit Union is reportedly the first credit union to go on this distributed system.

These systems are a response to both the recent growth of credit unions as an alternative to conventional banking operations and to the unique needs of credit unions, according to Bill Guiney, manager of systems and operations at Comteck.

"Credit unions handle a much greater amount of back-office work than either banks or savings and loan associations," Guiney said.

"Because the credit union's customers are typically the employees of one company, there is a heavy emphasis on payroll deductions and a substantially lower volume of cash transactions. This tends to increase the credit union's reliance on various forms to handle transactions," he explained.

In the Comteck credit union sytsem, terminals remove most of the burden of forms handling from the teller.

Comteck chose the Carousel because of its unique forms handling features. "No other terminal that we've seen has both a split platen and acceptable print quality."

Quick-Change Platen

Another Carousel 350 feature that Guiney regards as a plus is its quick-change platen. In less than a minute at the close of the business day, the split platen can be removed and replaced by a solid platen that feeds full-width, standard fan-fold paper for printing a variety of reports.

Larger credit unions would find it advantageous to have exclusive use of an on-premise transaction processor, Guiney noted. For one thing, the on-site mini gives them greater control over scheduling — to decide whether to print reports or to go on a transaction-by-transaction basis.

An in-house mini also cuts down dependence on the network staying up since the mini can operate independently of the host for long periods of time.

Finally, the in-house mini cuts down phone-line expense since communication with the host can be done with a single dedicated line, Guiney said.

In the case of local firms such as Conrail/-Amtrak, the PDP-11 is located at the same site as the central computer in King of Prussia.

Distributed Approach

Even so, Guiney said the distributed approach is an advantage. The IBM computer, he noted, is at its best when processing batch jobs. It can be very unresponsive to the real-time needs of many customers.

From Conrail's viewpoint, there are other advantages in using the distributed approach to processing.

For example, applications such as programming and operation scheduling were customized to their own needs. Conrail is also now able to do exactly what it wants when it wants, such as reporting and batch jobs on one minicomputer and real-time updating on another.

There was also a benefit in the speed and accuracy of check and receipt printing, the Conrail officials said.

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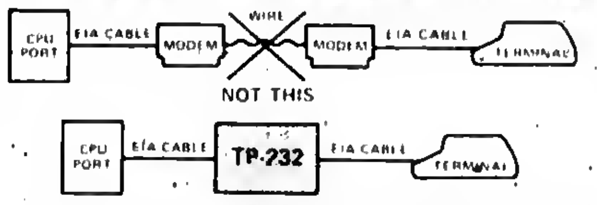

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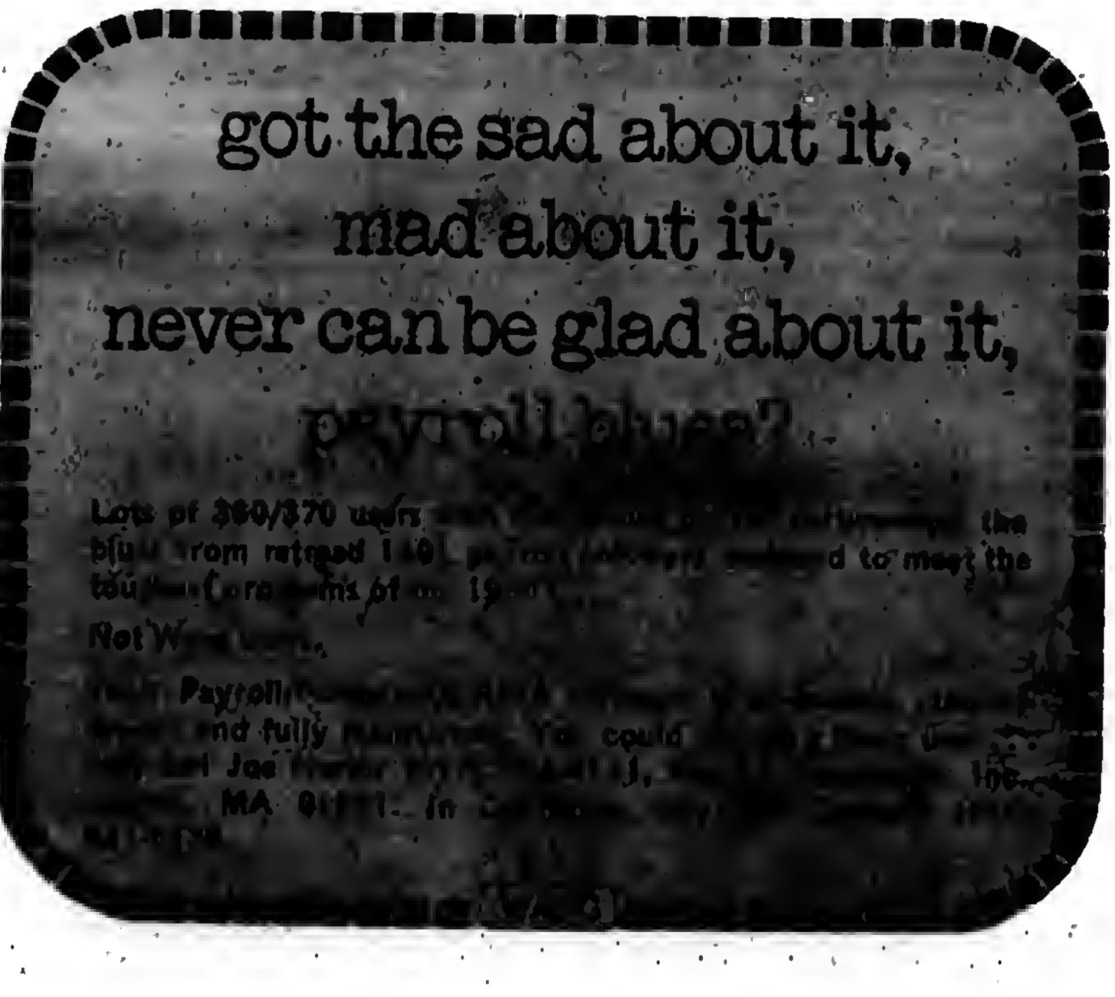

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DP Dialogue

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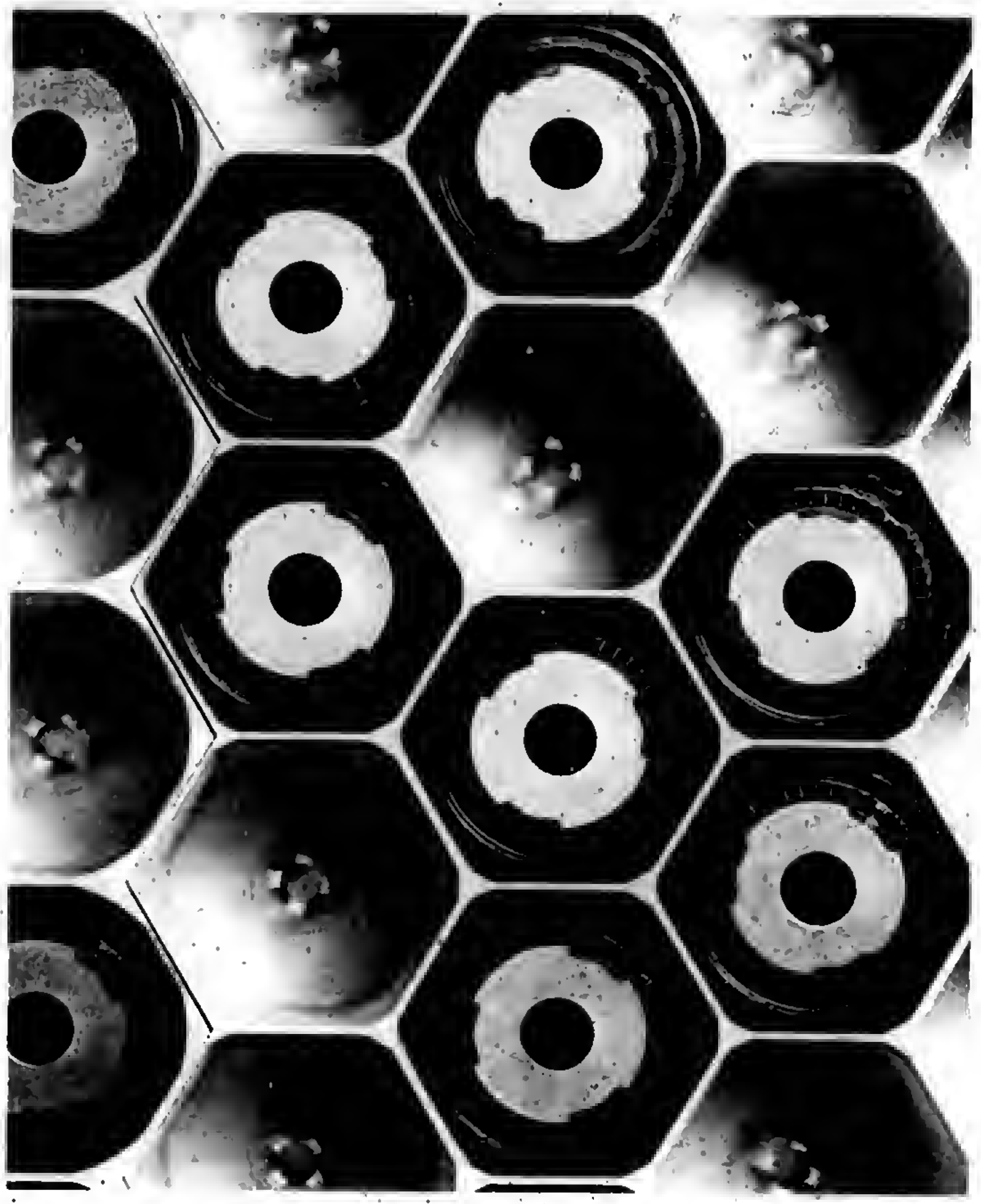


Honeycomb-like storage cells of the IBM 3850 Mass Storage System.
The MSS can put as much as 472 billion characters of data online to the computer.

3850 Simplifies Life at Dun & Bradstreet

"Our business is information," says Dun & Bradstreet's vice president, Gordon J. Aubrecht. "Every day, some 2,000 people—trained business analysts—gather that data through direct interviews with business owners. It is then our job to store, assemble, package, and disseminate it. Computers make that possible. And computerized verification and security programs help us monitor accuracy of the information while safeguarding confidentiality of the file."

The wellspring of its credit and marketing services to the business community is Dun & Bradstreet's data base on four million commercial enterprises. So the company is assured prompt access to any part of this file, D&B has chosen to use an IBM 3850 Mass Storage System (MSS), designed for the online storage of large quantities of data.

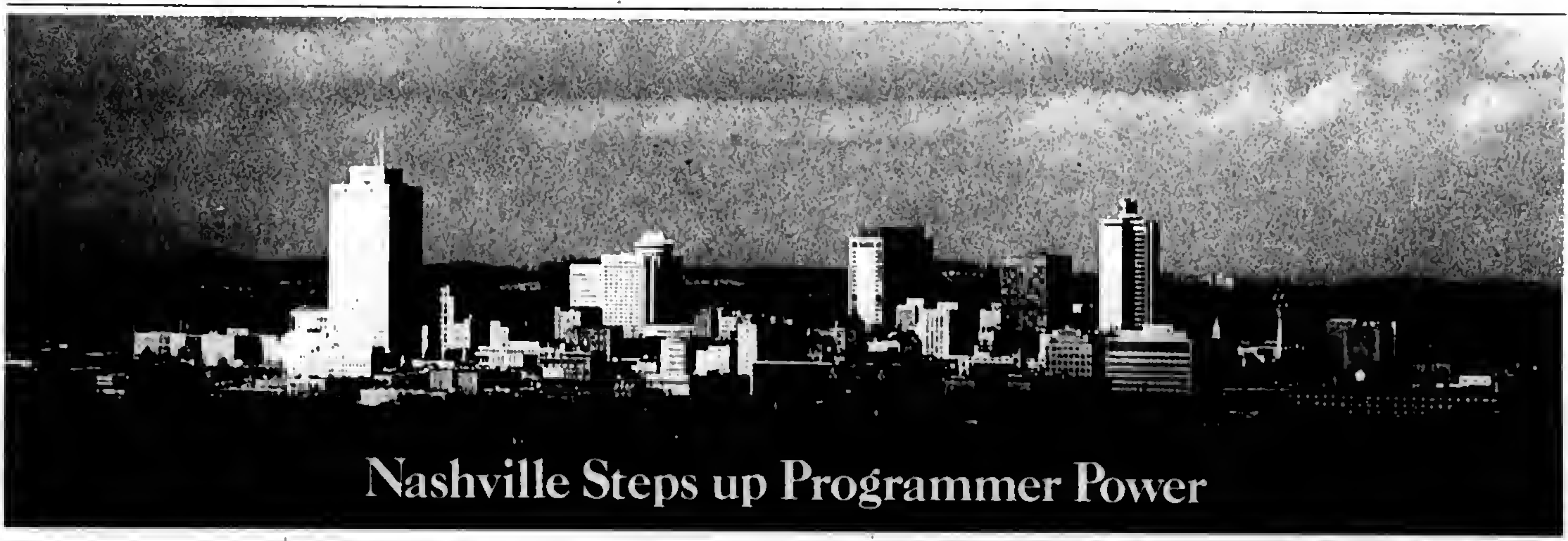
"The MSS gives us the benefits of high-speed disk storage, but at the cost of tape," Aubrecht says. "Since installation in our New York computer center, we have been able to cut back from 22 tape drives to eight, and have reduced our tape library from 22,000 reels to 16,000. And we expect that number to diminish to 8,000 before long." The center is equipped with two System/370 Model 158s.

"This file base is the foundation for many of our services," Aubrecht notes. "We computer-typeset—directly from the stored information—such publications as the Dun & Bradstreet Reference Book, The Apparel Trades Book and the Reference Book of Manufacturers. From the same file, we extract detailed, custom-tailored marketing facts, called Dun's Market Identifiers."

Adds Robert Porowski, director of computer operations and support: "The most important gain for us was the elimination of manual handling of tape. We've done away with thousands of mount/dismount operations each month and, at 2½ to 3 minutes per operation, that's hundreds of hours saved."

In the IBM 3850 Mass Storage System, data is recorded on magnetic tape enclosed in small cartridges, which are automatically retrieved by the system when required for read or write operations.

"The shift to MSS, along with other changes made at the same time, also yielded some direct hardware cost savings," Porowski added. "It's a new mode of storage, occupying a new place beside disk and tape in terms of cost and operating characteristics. By using it for the storage functions to which it lends itself—in our case, the equivalent of multiple data bases online—we're achieving important gains in performance and quality, significant cost savings and a real assist in internal operations."



Nashville Steps up Programmer Power

When the city of Nashville, Tennessee, adopted extended-area government, a metropolitan area of a half-million people was unified under one administration. One resulting efficiency is data processing service provided to the entire metro area—known formally as the Metropolitan Government of Nashville and Davidson County—from one computer center with an IBM System/370 Model 158. To increase productivity, the center uses three new aids to develop and maintain application systems.

One aid, called Hierarchy plus Input, Process, Output (HIPO), approaches program design and documentation in terms of small, functionally defined modules. Another, Structured Programming, makes programs easier to read and understand.

The third aid is Data Language/I (DL/1), an IBM data base manager. DL/1 structures data into a common format that allows many programs to access the same files, eliminating redundancies.

All three can reinforce each other to make application development and maintenance more productive.

How much more productive? Ron Dickie, director of data processing and computer services for Nashville, points out that, along with quantifiable improvements, many of the important benefits are intangible, such as improved forecasts of development times and costs.

Precise gains include a doubling of workload without an increase in staff size and using 20% to 40% less computer time to test new applications. And new programmers can write online programs after only two months of training.

"On that quantifiable basis, we identified $173,350 of costs actually avoided during the first year with the new techniques," says Mr. Dickie. "That's particularly impressive to us because it was a busy year, in which we developed seven major application systems."

Because program development now is done in a modular fashion, a programmer needs only one week, on the average, for coding and testing a program.

And program maintenance activity was greatly reduced under DL/1. "We used to spend a lot of time in rework," says Mr. Dickie. "Now we alter data bases and switch storage devices without making program changes.

"All in all, HIPO and DL/1 and Structured Programming have proved to be a winning combination. They've helped us serve our citizens better while saving some hard-earned taxpayers' dollars."

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

Olivetti Brings Out 8-Bit Teleprinter Available in RO, KSR and ASR Versions

NEW YORK — Olivetti Corp. has introduced an 8-bit teleprinter that is available in three versions — receive-only (RO), keyboard send/receive (KSR) and automatic send/receive (ASR).

The basic Olivetti TC 480 for sending and receiving messages can be upgraded with optional I/O units and memory to an interactive terminal for on- and off-line data collection, time-sharing, batch communications, limited text editing and word processing, according to the firm.

The basic terminal is equipped with a standard TTL serial interface for local connections. For communications, it can be optionally equipped with a variety of interfaces including RS-232 and current loop, which allow communications at four operator-selectable speeds from 75- to 1,200 bit/sec, Olivetti said.

In the optional communications mode, the teleprinter communicates asynchronously in Ascii code in a 10- or 11-unit character structure, the firm added.

The TC 480 keyboard generates the 128-character Ascii set. An optional numeric pad is available to facilitate numeric data entry as well as dialing remote terminals over switched lines, it noted.

The device prints 7 by 9 dot-matrix characters at speeds up to 30 char./sec, Olivetti said, adding up to 132 char./line and up to 64 characters can be stored in memory when the terminal is in receive mode.

A horizontal and vertical tab option stores seven tabulation programs in erasable programmable read-only memory (Eprom).

In addition, one priority program resident in optional random-access memory (RAM) can be stored through the keyboard,

Terminal Transactions

from the line or from the optional I/O units, the company noted.

Optional I/O units include an 8-channel tape reader and combined reader/punch, an integrated double magnetic cassette unit with storage of 160K bytes, a built-in minidiskette with an 8K-byte capacity for text editing and an 8K byte RAM for additional editing.

The TC 481 receive-only (RO) terminal is priced at $1,625. The TC 485 KSR costs $1,750.

The tape reader/punch costs $800. The cassette unit can be added for $1,200, the minidiskette for $1,050 and the additional 8K RAM for $900, according to a spokesman, who added the options can be factory or field installed.

RS-232 or 20mA current-loop interfaces cost $100 and $120 respectively, he said.

The terminals will be available in September from Olivetti at 500 Park Ave., New York, N.Y. 10022.

Printer Made for 3270 Types

ANN ARBOR, Mich. — Interface Systems, Inc. (ISI) has brought out a multifont printer that it said can print characters ranging from .1- to .7 in. high from the screen of an IBM 3270 or compatible CRT terminal.

The 4100SC is plug-compatible with IBM 328X printers. It can also print a variety of standard bar codes on 8-in. lines and can print at speeds up to 120 char./sec, according to the firm.

Applications for the 4100SC include materials handling and warehouse systems.

The printer is priced at $6,400 from ISI at 462 Jackson Plaza, Ann Arbor, Mich. 48103.

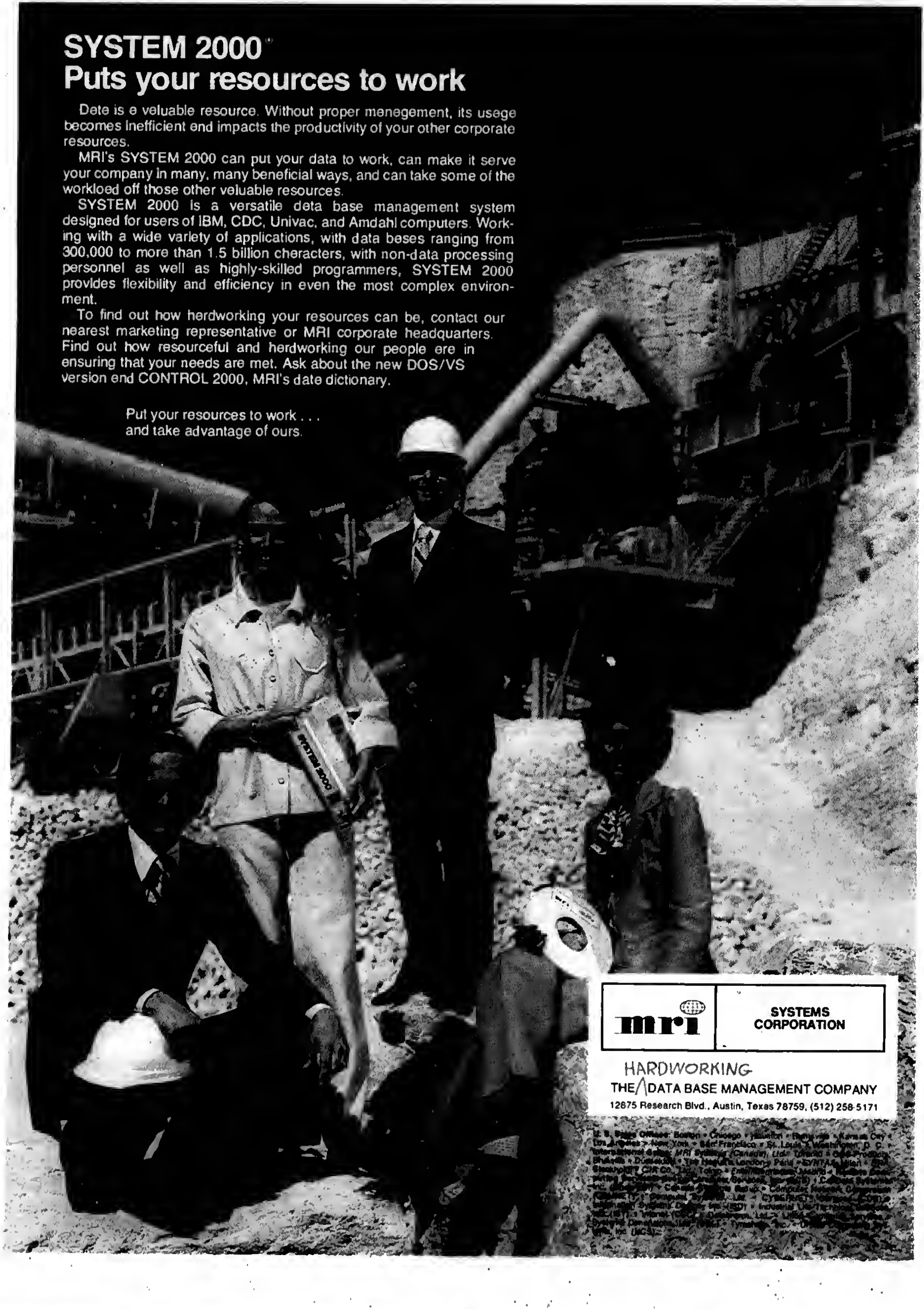
CPT Micro-Based Unit Aimed at Office Sites

HOPKINS, Minn. — CPT Corp. here is offering a microprocessor-controlled, Selectric-type terminal for office communications.

The terminal is said to be compatible with a variety of line disciplines. In its standard configuration, it enters and receives Ascii data asynchronously at transmission speeds up to 300 bit/sec, CPT added.

The unit is also plug-compatible with the serial I/O port of calculators and computers.

The terminal costs $2,500 from CPT at 1001 S. 2nd St., Hopkins, Minn. 55343.



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Bits & Pieces

Memorex Introduces Line Of Double-Density Floppies

SANTA CLARA, Calif. — Memorex Corp. is offering a line of double-density flexible disks for use with its models 550 and 552 and equivalent flexible disk drives.

Three double-density Markette configurations are available: a soft-sector, single-sided disk with a storage capacity of 3.8M bits; a soft-sector, dual-sided unit with 7.6M-bit capacity; and a disk with 32 hard sectors and a 6.4M-bit capacity. All of the disks feature 77 track/side.

As a result of a proprietary surface coating, the disks perform at least 10% better in terms of bit shift and show a 20% improvement in signal resolution over competitive media, a spokesman claimed.

Markettes cost approximately $75 for a carton of 10, he added from the firm at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Verifier Reads ABA Code

DALLAS — American Magnetics Corp. introduced a Magstripe Verifier here recently that reads and displays encoded American Bankers Association (ABA) data on magnetic stripe cards.

The unit, which has a 38-digit LED display, allows users to see what is encoded on the magnetic stripe and to verify that the card is encoded to ABA standards.

The $1,495 verifier is available from the firm at 2424 Carson St., Torrance, Calif. 90501.

Punch Has Protective Case

CUMBERLAND, R.I. — The Digitronics Division of Comtec Information Systems, Inc. has a 75 char./sec punch mounted in a protective suitcase.

The P 8075/B punches 5- to 8-level data on 1-, 7/8- or 11/16-in. wide paper or mylar tape. Punching tolerances exceed RS-227A requirements, the firm claimed.

The punch sells for $1,995, from the firm at 53 John St., Cumberland, R.I. 02864.

Pericomp Has Tracking Tape

NATICK, Mass. — A prerecorded tape that allows users to verify tape tracking has been introduced by Pericomp Corp.

The tape allows users to utilize an oscilloscope to determine necessary mechanical head adjustments. Outputs allow verification of correct forward and reverse, 7- or 9-channel tracking to within .0005 in., a spokesman claimed.

A 600-ft tape costs $120 and a 1,200-ft tape sells for $220 from the firm at 14 Huron Drive, Natick, Mass. 01760.

And Saves $3,500/Mo

Data Entry Cuts Claims-Processing Job

SEAL BEACH, Calif. — The Group Insurance Services Department of Rockwell International Corp.'s central payroll/-personnel operations has combined several functions into a single keying procedure using programmable workstations. As a result, the firm said, it is saving more than $3,500/mo in clerical labor while producing reports and documents more rapidly than before.

The Group Insurance Services Department processes hospital and medical claims for 47,000 employees in Rockwell International's aerospace, electronics and automotive operations, as well as for corporate staff employees, who are covered under one of two basic insurance plans. The claims-processing operation issues 1,300 to 1,500 benefit checks a day.

In the previous claims-processing operation, after incoming claims were coded and priced, a four-part worksheet was prepared, one copy of which was filed in the insured's claims file. Another copy was sent under batch control to the company's data center at Downey, Calif., for keypunching the data used to generate the "Classification of Benefits" report that goes to the insurance carrier and is the basis for reimbursement of benefits paid by the company.

Depending on the plan involved, other worksheet copies were batched and sent directly to the carrier for keypunching and generation of various statistical reports.

In addition, a copy of the worksheet was batched with payment dollars totaled and sent to three remittance advice typists in Group Insurance Services. After the four-part remittance advices were typed, an adding machine tape was then run to prove the totals to the batch controls.

The remittance advices were next forwarded for typing of the benefit checks and carbon copy check registers. The checks were signed, protected and totaled. The totals were proved to the batch totals, then audited against a copy of the worksheet and matched with the proper remittance advice.

The check and remittance advice were finally mailed to the payee. If the payee was the insured, a copy of the worksheet was enclosed. If the payee was other than the insured, the worksheet copy was mailed to the insured separately. The entire procedure was manual, including reconciling of the bank account.

"There were several obvious disadvantages in the system," Henry D. Mjellem, manager of Group Insurance Services, recalled. "The major difficulty, of course, was the labor-intensive nature of the operation from the time the worksheets left the pricers' desk with the resultant delay of issuing benefit checks.

"Aditionally, certain errors in the benefits detail area were not discovered until the keypunching and verifying functions were completed prior to running the classification of benefits report.

"We needed a system that would integrate all of the steps of processing benefit checks and capturing data for the reports with a single data entry procedure."

After a study of available hardware, Rockwell International selected the IBM 3740 data entry system for two reasons. "First, it provided us with a multiunit, stand-alone system that would not be affected by downtime which might occur in a system that used a central processor,' Mjellem said.

"Second," he continued, "since the system allows us to do on-site processing, the

(Continued on Page 32)

Merged Technologies — Part 1

Union of On-Line, COM a Winning Combination

By William McCullough
Special to Computerworld

The use of both on-line systems and computer output microfilm (COM) has increased dramatically over the past five years and there is every indication this growth will continue at an increasing rate in the forseeable future. These elements, used individually or collectively, can solve many of the problems associated with computerized information systems.

This is the first in a three-part series that looks at the integration of on-line and COM systems by William McCullough, national sales manager for U.S. Datacarp, a COM service organization.

Unfortunately, many organizations are overlooking the potential cost reduction and system enhancements possible by merging on-line and COM technologies. All too often, on-line systems are developed without any thought to the roles micrographics could play in meeting the requirements of the planned system.

The result can be a system that costs far more than necessary in software development and added computer hardware.

There are a number of reasons for this problem. Primarily it is a lack of knowledge on the part of systems designers regarding the ways in which COM may be used effectively with on-line computer systems.

This lack of knowledge can be attributed to a lack of user education by the COM industry compared with that carried on by the computer industry related to on-line technology.

There are six areas of concern with COM and on-line systems that should be examined. They are systems design and programming, data retrieval and output speed, distribution, comparative costs, real time/-current status and history/audit trails.

It is common knowledge among computer professionals that the design of on-line information retrieval systems is a lengthy and expensive undertaking. It requires a great deal of effort on the part of even the most sophisticated systems and programming staffs.

This is particularly true if the CRT is the principle or only media used to deliver whatever information is required from the total on-line information data base. If you are not certain why this is so, consider what it takes to get there.

There are three important aspects of on-line systems design and programming; loading, maintenance and back up. Loading includes data indentification, data preparation, file designation/allocation and file loading.

Maintenance includes programs for updating the data base, retrieving from the

(Continued on Page 31)

How Far Can You Stretch?

Budgets are tight everywhere — especially in the DP department. Most managers are actively seeking ways to stretch the DP dollar, and many are succeeding.

Stretching the DP dollar will be the subject of a *Computerworld* special report in September. The report will cover many aspects of saving DP dollars, from choosing the right equipment for the right job to optimizing equipment usage.

Readers are invited to contribute articles detailing their experiences wrestling with DP budgets and what they did to save money. Success stories are welcomed, but details of money-saving schemes that flopped are also welcome.

Contributions should by typed (double-spaced, please), limited to 1,200 words (four or five pages) and sent by Aug. 15 to Frank Vaughan at CW, 797 Washington St., Newton, Mass. 02160.

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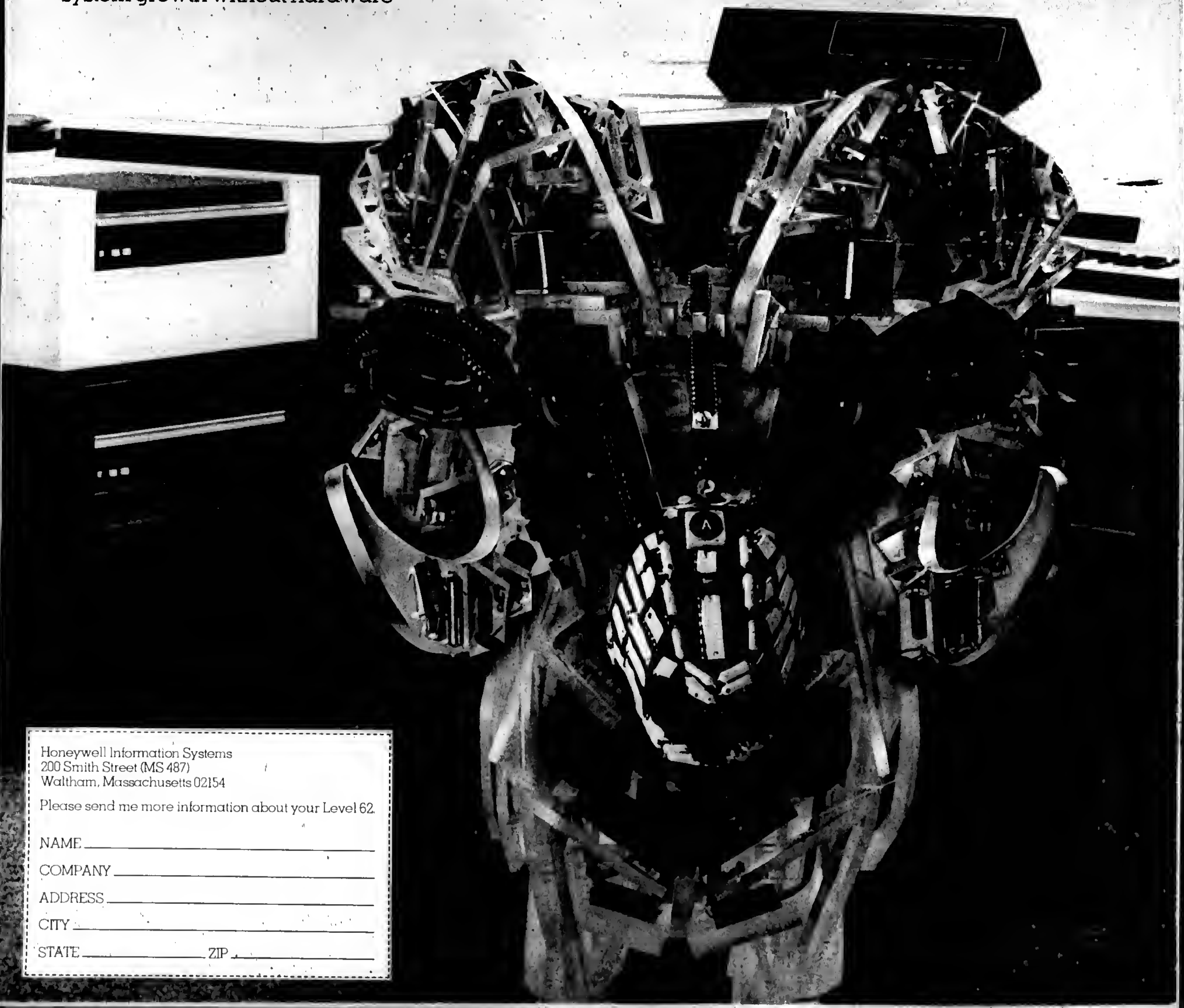

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On-Line, COM Union a Winning Combination

(Continued from Page 31)

data base, preserving the integrity of the data base and purging from the data base. Backup includes media conversion, distribution and fail-soft.

It would be relatively easy to make a case against a true on-line system, particularly if time was taken to dwell upon the steps which are involved in each of these actions. Examine how much easier the job may become when micrographics, particularly COM, is combined with the on-line system.

For example, the loading task could be reduced to dealing with key fields, the computerized index to the COM data bases. The maintenance task can be similarly simplified to updating index pointers in the reduced size data base.

Programming for data retrieval from only a few fields and not all of the information in the total data base is proportionally reduced. Backup can be virtually built in, as COM-generated indexes could take over in the event of system failure.

Perhaps the most difficult task when considering COM in conjunction with an on-line system is to define the requirements of the system and determine how extensively COM might be used in the system. If the data base already exists, then the COM formatting software for creating the indexes described above is normally available from COM manufacturers and service bureaus.

The programming involved generally has to do with incorporating this software with the host programs which maintain the data base. Generally, this is neither a difficult nor lengthy task.

Retrieval and Output

In discussing retrieval and output speed relative to on-line systems, we find ourselves talking about the glamour issue of the DP field which was brought to life during the 1960s. Although it is still very much alive today, the 1970s have been dominated by first the mini and now the microcomputer.

Those familiar with CRTs and on-line information retrieval systems know it is hard to beat their speed of output. But what did you have to *input* to obtain that output? How easy was it to learn the particular retrieval language of the system?

Can you get the answers you are really looking for? Only if the data is there and is addressable.

At the cost of becoming all-encompassing, some systems become too cumbersome, and this jeopardizes their processing time advantage.

What can be done to make an on-line system more effective and maintain those features most wanted by its users? A careful and unbiased analysis of the information contained in any large on-line data base should provide statistics on key fields, activity percentages, summaries vs. details and accuracy.

Looking at Findings

In looking at the findings, several distinctions should soon become evident. First, a disproportionate share of the file receives the majority of the activity. Second and similarly, a small number of the data fields receive the majority of the action.

Considering the steps that were probably taken during the design phase of an on-line system to separate the wheat from the chaff, there still will be found data that is not really worth all the time and money it takes to store, update and retrieve it. Here is where an integration of COM-generated microfiche and the on-line system can best be introduced.

Overall speed of key information retrieval via CRT can be increased at no expense in data availability. The data entry or keying part of the retrieval can be simplified and combined with smaller files, less data to search and less to output to the CRT; a net increase in throughput should result.

All of the noncritical and detail information can be moved off-line to microfiche and, if needed, referenced on the CRT by fiche number and grid coordinates.

It cannot be denied that there are certain functions which rightfully belong to on-line systems. What I am attempting to emphasize is a method to enhance those functions and provide an even better total information retrieval system.

Fiche Aid

SKOKIE, Ill. — Business Efficiency Aids, Inc. is offering the Model PI-100 Magnetic Micro/Finder Tray of high-impact plastic for storage and retrieval of microfiche.

The PL-100 includes 100 Magne Dex separator cards. Magnetized siderails provide a power supply to separate fiche for retrieval.

The unit, with four vinyl index guides and a vinyl dust cover, sells for $24.95 from 8114 N. Lawndale Ave., Skokie, Ill. 60076.

Proceedings Published

PHOENIX — Honeywell Informations Systems, Inc. here has published the proceedings from its Computer Security and Privacy Symposium held in Scottsdale, Ariz., last April.

The proceedings cost $25 from Jerome Lobel, computer security manager, Mail Station K-99, HIS, P.O. Box 6000, Phoenix, Ariz. 85005.

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Hardware Index Registers	15	2	8
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Directly Addressable Memory(KB)	64	2	56
Automatic Interrupt Vectoring	Standard	N/A	Standard
Parity	Optional	Optional	N/A
Cycle Time (nanoseconds)	600	800	725

PRICE	6/16	NOVA 3/4	PDP-11/04
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CW 7

Data Entry Integrates User's Claims-Processing Tasks

(Continued from Page 29)

documents do not have to leave the department. We can therefore have immediate reaction to error conditions, rather than having to wait for error reports to be returned from the data processing center."

Rockwell International's data entry system consists of one IBM 3741 Model 4 and four 3741 Model 3 programmable workstations, each of which has an 8K-byte core memory. The Model 3 units are equipped with dual diskette drives and two of them have printers attached, a 3717 line printer and a 3715 bidirectional character printer.

All of the workstations can be used for keying and, in addition, the Model 4 has the capability to transmit data to one of the six IBM 370/168s at the central computer center.

The previous multiple-typing tasks are now accomplished in one data entry procedure performed by three operators. Under program control, as the coded information from the worksheet is entered it is automatically run against tables stored in the program, with erroneous data rejected.

The program also adds dollar amounts and audits the check totals to worksheet totals during the input procedure; in addition, it displays the grand total of checks for balancing against predetermined batch totals.

The information is recorded on diskettes which are then placed in one of the workstations attached to a printer. The benefit checks are printed automatically with the remittance advice, which is now a stub on the check. The separate remittance advices are no longer used.

The check registers are also printed automatically on the printer-equipped workstation. At the same time, an output diskette is generated for transmission of classification of benefits and check reconciliation data to a central computer at Downey.

The classification of benefits report is now printed directly from the transmitted data, eliminating the previous keypunching and verifying functions.

"Although only three operators are required to handle all of the work in the present system, we trained all six of the typists who were doing the work before," Mjellem said. "Three of the employees filled other openings in the department and now provide backup during vacations or in case of illness of the three full-time operators."

Biggest Advantage

"The greatest advantage has been in saving over $3,500 a month by reducing the number of people required to do the typing and data input from seven (including the full time of one keypunch operator) down to three, but we are realizing other significant benefits as well," according to Clarence P. Dietterich, manager of systems development for the central payroll/personnel operations.

"For example," he explained, "previously there was always a backlog of one or two days' work for the check and remittance advice typists, even though they frequently worked as much as four hours a day overtime. Now they can keep up with the large volume of worksheets generated by our 26 pricers, even during the big work crunch that typically occurs during January and February.

"Overtime is now practically nonexistent and the workload is up-to-date at the close of each day."

Greater accuracy is another area in which the data entry system has been of great advantage, Dietterich said. Since all of the edits and audits are built into the system, corrections are now made at the point of entry.

This in turn has speeded up the job of balancing and printing the monthly "Classification of Benefits" report. In the past, this report usually could not be completed until after the middle of the following month; it is now mailed no later than the ninth day of the month.

The information transmitted from the diskettes is also used at the data center to create a magnetic tape which is now sent to the bank. This enables the bank to reconcile the account on its own computer, thereby eliminating the need for manual reconciling by Group Insurance Services personnel.

"The system has also made it possible for us to achieve additional savings by eliminating the four-part remittance advice forms and the carbon copy check register. Moreover, we no longer incur the expense of buying and storing data cards. We require no more than about 150 diskettes for recording all data, and these are continually recycled," Dietterich said.

"Since we put the system into operation, our complete claims-processing cost of about $3 a claim has been maintained in spite of increasing labor costs — a very low figure in comparison with average claims-processing costs throughout the country," he concluded.

Emerson Designs UPS For Big Applications

SANTA ANA, Calif. — Emerson Electric Co. has introduced a 415 Hz uninterruptible power supply (UPS) system designed to allow users to enhance present UPS systems:

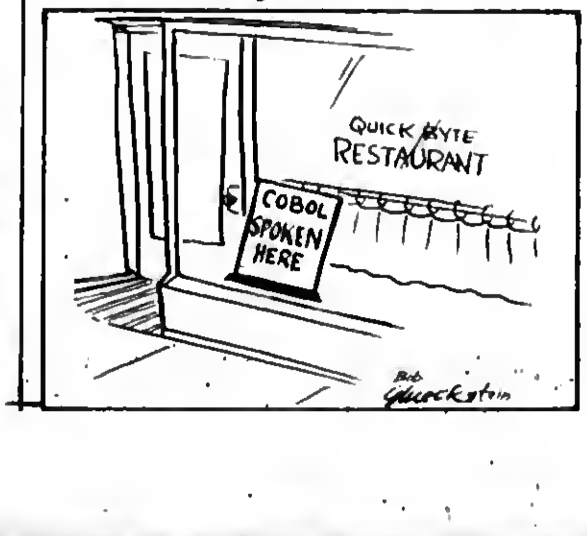
The AP91 is compatible with existing Emerson 60 Hz products and can utilize a common battery to save space and equipment costs, according to a spokesman.

Standard features include alarms, adjustable battery charging rate, dc ground fault protection, dc under- and overvoltage protection, manual output voltage control, input current limiting and input line protection.

Options for the AP91 include ac ground protection, alarms and indicators, line dip compensation, meters, remote meter and alarm panels, shipping breaks, switchgear and a 50V proportion signal.

An AP91 system costs approximately $35,000, depending upon configuration. The battery is an additional $10,000 to $15,000, depending upon capacity.

The battery must be purchased separately, the spokesman noted from the firm at 3300 S. Standard St., Santa Ana, Calif. 92702.



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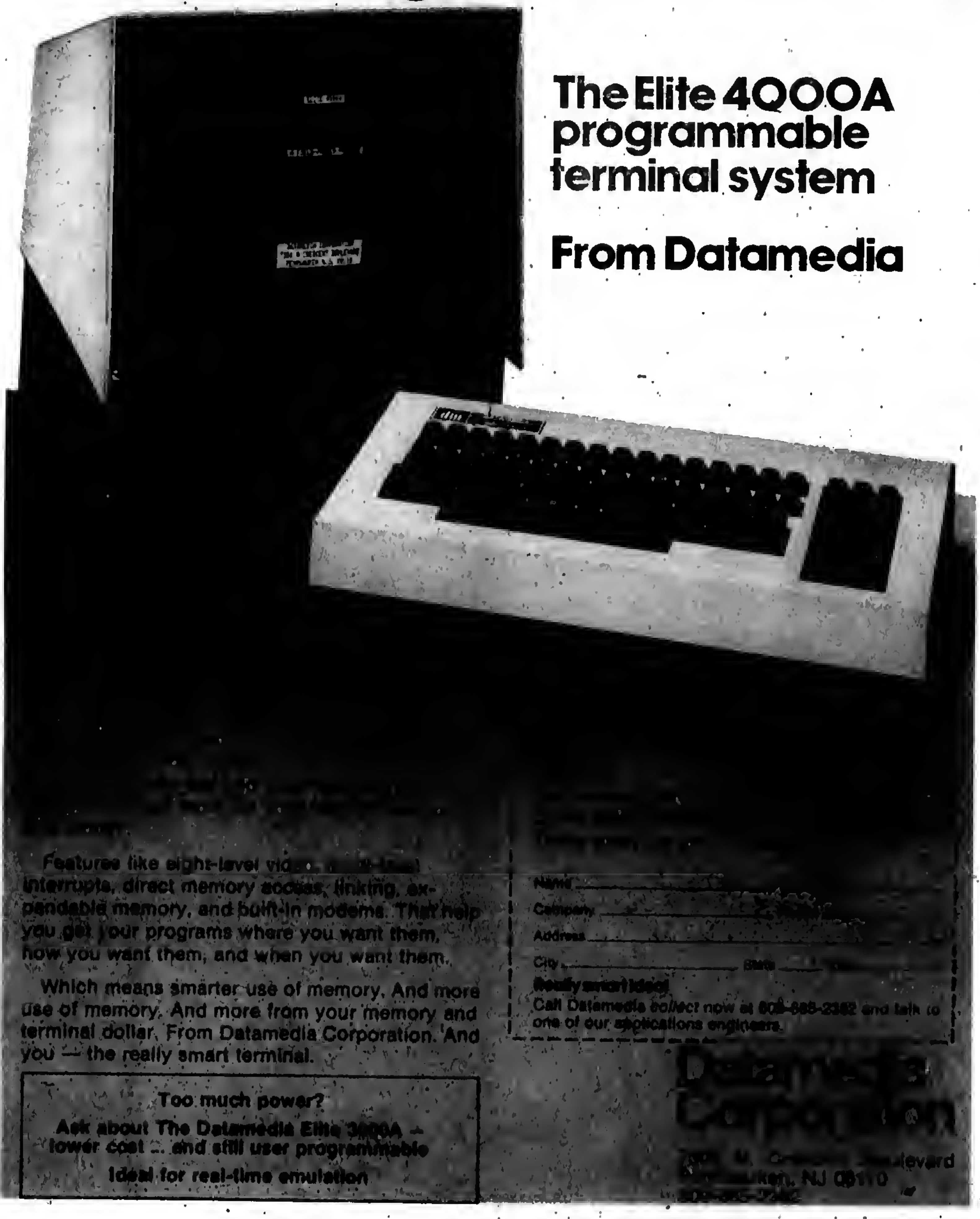

Mini Bits

Maker of Array Processors Establishes Group for Users

PORTLAND, Ore. — Floating Point Systems, Inc. has formed a users group open to users of its array processors and "those making significant contributions to the technology."

The group will sponsor meetings and papers about the technology, the firm said. At the first meeting, 47 users heard papers on subjects ranging from speech processing to physical chemistry, the company noted.

Users wanting more information should contact Lynn McDaniel, the user group coordinator, at P.O. Box 23489, Portland, Ore. 97223.

Mailing Envelope Designed To Protect Floppy Disks

SMYRNA, Ga. — A mailing envelope for floppy disks said to save users 44- to 50 cents per disk in first class postage is available from Curtis 1000 here.

The envelopes accommodate one to five floppies in filing sleeves and are said to provide a lint- and dust-free environment. They are reportedly resistant to tearing and puncturing forces and protect the disks against chemicals and wetness.

Prices for the envelopes vary from about 14 cents each in very large quantities to 27 cents each in quantities of 100. The company is located at 1000 Curtis Drive, Smyrna, Ga. 30080.

Swap Proceedings Published

LOWELL, Mass. — The proceedings of the 1976 Society for Wang Applications and Programs (Swap) users society symposium is available. The 725-page publications contains over 50 papers presented in seven sessions.

A copy of the proceedings can be obtained for $17.50 from Wang Laboratories, Inc., Swap Users Society, One Industrial Ave., Lowell, Mass. 01851.

HP Has Mini-Based GC/MS

PALO ALTO. Calif. — The Hewlett-Packard Co. 5990 series gas chromatograph/mass spectrometer (GC/MS) incorporates an HP 21MX E-Series system with a dual-disk drive, according to the vendor.

The GC/MS is fully integrated into a desklike cabinet that sits atop the two-bay data system, HP said. Because the operating system provides compilers for Fortran II and IV, Algol and Assembly language as well as a Basic interpreter, users can develop their own programs for the unit, the firm noted.

A basic system excluding CRT terminal costs $70,000, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

The Turnkey — Part 2

Users Must Determine Needs in Advance

By Vincent Deschamps
Special to Computerworld

It is singularly important for users to establish the criteria that are to be used as the selection and contract standards for a turnkey system. Users must determine their requirements in both hardware and software.

One of the first areas to be tackled in the hardware arena is determining what is needed from input devices. Find out the volume of transactions to be processed through the system, because this will help you establish the amount of power a mini must provide to perform your applications. The number of input devices will be determined by your workload.

Consider peak work periods for determining volumes of transactions. Peak work periods are indicative of maximum volume; off-peak levels will not give you the real parameters of the requirement you have for input devices. Seasonal effects must also be considered if volumes are affected.

Determine how many people need or should be able to gain access to the computer at the same time.

Availability of the computer should be based on a need for instant information. Analyze how many people need instant information at the same time.

This is the second article in a three-part series dealing with how to successfully install a turnkey minicomputer. Next week's installment will include recommendations for implementation procedures and scheduling.

Establish whether input devices can be shared by personnel without inconvenience. Key executives in one or more departments may need immediate access, but that does not necessarily mean each one requires his own terminal.

Determine whether the device should offer video or print capabilities or whether the user needs both.

Data Base Size

To determine the size of the data base, list every type of data to be stored, such as number of customers and number of inventory items. Then determine the approximate number of characters needed per type and amount of data.

Finally, analyze this data base according to peak periods. Figure the maximum size these files will be during the year. To figure out hard-copy output requirements, determine how much data needs to be printed daily, weekly, monthly and quarterly. Massive volumes of computer printouts are expensive and not necessarily meaningful and useful in a real-time computer system.

Next, determine the time frame you're willing to live with from the time data is prepared to the time it is to be printed and delivered. It is important to establish how many printed copies are required on the basis of utilization — not desire. Your result will determine the type and speed of the printers necessary.

Accessibility of the data base is another criterion users should consider.

First, establish the times data is required and make your decision on whether the requirement is immediate, once a day, once a week, once a month or once a year.

Next, establish the volume in each of the categories.

Determine the format or media for each type of data to be presented — soft copy

(Continued on Page 34)

Desktop CPU Wins Over User By Easing Market Research Job

By Esther Surden
Of the CW Staff

BIRMINGHAM, Ala. — "From talking to my colleagues around the country, I've heard that even if you have access to a big computer, the market research department always comes after the janitor in getting use of it."

With these words Thomas M. Adams, manager of public affairs for the *Birmingham News* here, told why he likes using his small desktop minicomputer system.

Adams didn't always enjoy using the small system; in fact, he resisted the switch from an Olivetti calculator to something more complicated.

"I used the Olivetti for market research data, but I also had to do rate schedules and amortization schedules with it. With the way interest is going up, we would overload the Olivetti," he explained.

"We finally got the Hewlett-Packard desktop system after the general manager wanted me to run something he was working on and the calculator couldn't handle it," he recalled.

The department looked at systems from Wang and Rockwell International before choosing the HP 9815. "I didn't want to learn how to program it, so I said 'You get me someone to program it, and I'll take it,' " Adams said.

The newspaper got a programmer right out of college to program the system, "but he just couldn't handle it. He'd learned Fortran and Cobol."

Next Adams looked around for a school that could teach him how to handle the system — but there wasn't one. HP didn't have a training program, he said, and the colleges had bigger things on their minds.

Finally, he found a freelance programmer

(Continued on Page 34)

AJ Extends Options for Novices

SAN JOSE, Calif. — Joining the other terminal makers that now offer small business systems to first-time users, Anderson-Jacobson, Inc. (AJ) has introduced a system it said features multiprogramming capability and can accommodate up to eight terminals interactively.

The AJ 1500, built around an updated version of the Eldorado Electrodata Corp. CPU, is diskette-based, unlike the older system. It was designed for certified public accountants and accounting practices.

Accounting Software

The accounting software, designated CPA III, includes programs for general ledger, budget accounting, non check-writing payroll and loan amortization. Optional packages such as accounts receivable, accounts payable and payroll with check writing are also available.

A text editor for word processing can also be added to the system, AJ noted.

Available through a network of dealers, the system can be compared to the Burroughs B80 and IBM System 34 for most of its functions, an AJ spokesman said. Service will be provided through AJ's service centers in 40 cities, third-party service or local dealers depending on the location, he added.

A basic AJ 1500 includes 32K bytes of core memory, two 630K double-density diskette drives and a 45 char./sec daisywheel I/O console printer.

Optionally, the AJ 1500 system can be expanded to include 64K bytes of core memory, four diskette drives and four 10M-byte cartridge disk drives. Users can also select a 60- or 120 char./sec dot matrix printer, a CRT or a 300 line/min printer.

The basic system costs $19,990 including the CPA III software, the company said from its Computer Systems Division, 521 Charcot Ave., San Jose, Calif. 95131.

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University Slates Short Mini Course

MILWAUKEE — A short course on minicomputer and microcomputer systems will be held at the University of Wisconsin Extension here Sept. 26 - 30.

The course is designed for engineers, scientists, system designers, system programmers and applications specialists who want to expand their knowledge of computer hardware and software, according to a spokesman.

It is intended to teach computer programming fundamentals on which "the more advanced topical coverage of the later portions of the course will be based," he noted.

The course costs $375. Information is available from John T. Snedcker, Department of Engineering, University of Wisconsin Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

Users Must Analyze Needs in Advance

(Continued from Page ''

(CRTs) or hard copy (printed report). Make this decision based on whether a screen response is adequate or whether a printed document is necessary, under what circumstances and how often.

Software Considerations

In the software area, find out if the vendor provides proven applications program packages. These are always less troublesome and less expensive than customized packages if they fit your application.

If they don't fit, they will be more troublesome and more expensive in the long run.

Make a list of software capabilities you require of the vendor. Make sure it already has or can deliver efficient software packages for your specific applications at a reasonable cost.

This is expecially important because, to the unsuspecting, software can cost more than hardware, especially if it involves custom development.

Favor the vendor who has experience in your industry. If many companies within one industry have different requirements, you can believe that most companies in different industries have multitudinous varieties of requirements.

Finally, make sure the vendor is contractually agreeing to take "turnkey" responsihility. "Turnkey" means making sure all the hardware and software is delivered, installed, operational, debugged and documented. In simple words, you plug it in, switch the power on and your system is ready to go.

Since the purchase, lease or rental of a minicomputer system represents a significant investment, all of the elements in the contract should be delineated:

- All responsibilities of the vendor and user should he clearly defined.
- There should be a finite plan which details the development of the system from beginning through installation as an integral part of the contract.
- The contract should also stipulate that complete documentation will be provided hy the vendor.

Deschamps is president of Turnkey Sales & Leasing, Inc. in New York City.

Desktop Mini Wins Over User

(Continued from Page 33)

who knew the system. "He was going to do all the programming, but when he charged $1,000 for one application" Adams had second thoughts.

"I took home one of the applications and a book explaining the system and worked it out on paper. I became so confident that it would work that when I tried it it did work," he said.

That began the public affairs manager's love affair with the system. Since then, the department has been using it for a variety of applications.

"When the marketing research operation was first initiated in 1969, its primary aim was to provide reader profiles to the editorial staff," he explained. "But, after accumulating all of the data, we realized what a tremendous help the information would be to area businesses.

"Now, after seven years of surveys, we find that many businesses have come to rely on us — anxiously calling weeks before the due date to check our status," Adams said.

The procedure for gathering an audience profile may take as long as six months. Researchers from an outside consulting firm visit an average of 125 homes per month in the Birmingham area — 1,500 per year — with a list of questions to ask each member of the household.

Through the years, this list has been expanded and refined until it presently includes detailed questions about reading, shopping and living habits.

Survey data is entered into a large outside time-sharing computer located in Dallas, Texas, for batch processing. The results are returned to Adams through a terminal located at the newspaper.

"Time-sharing is expensive, so we use it as little as possible. That means we try to minimize the work done by the large computer to only the large statistical correlation problems. The smaller computations, finishing touches and final printing are all accomplished on our desktop system," Adams said.

"The survey results, as they return from the time-sharing system, are entered into the 9815. The small computer then further processes the information into a readable format complete with line and bar graphs.

"By using the system with an HP printer, we can produce final printed copies without incurring the added expense of hiring a layout and paste-up person."

The editorial department of the *Birmingham News* uses the system to plan story features to meet reader interest. The advertising department uses the report to sell advertising, test ad campaign effectiveness and adjust rates. Area business firms that subscribe to the service use the information to develop marketing strategy.

One area firm, planning to open two more stores, consulted the report to choose the best site locations. The firm was provided with a list of recommended and alternate locations.

Adams has also been contacted by a number of national firms interested in moving into the Birmingham area that want a profile of the average employee and customer.

Another job of the computer is computing and adjusting advertising rates and printing new rate cards. This operation, which used to take a day and a half on an adding machine and typewriter now takes a minute and a half on the small system.

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Firm Sold on Open-Minded Programming To Solve Sales Problems Using Mini

GRAND RAPIDS, Mich. — Because "we didn't want to get locked into a type of thinking in which we were going to serve the computer instead of the computer serving us," Bob Jones Corp. had its small business system programmed by a company that had an "open mind," according to Bob Tourek, president of the company.

The firm went the small business system route after using a service bureau for several years and even doing some in-house keypunching. It chose an IBM System 32 after looking at several alternatives. It "was the only one that could fulfill a secretarial function," Tourek stated.

Then the firm searched for a programming company to fill its needs. Several were suggested by IBM and after interviewing representatives from all of them, Bob Jones chose Computer Directions, Inc. The firm was just starting out, Tourek explained, and it was flexible enough to see the computer as a tool for solving sales problems.

The system, which captures and maintains data on sales histories to produce a number of reports, prints the reports in a format that is easily understood by both the salespeople and the customers.

Other reports compare year-to-date sales figures for the current year and the previous year as well as the sales figures for the same three months of the previous year. This allows the company to evaluate sales for the current year in relationship to the same period last year and plan sales tactics, he explained.

Promotion reports are used to help account for large fluctuations in sales and to evaluate the success of specific types of promotions.

The system also provides trend reports comparing average weekly movement for the previous 52 weeks with similar figures for the prior 52 weeks. These reports, detailing the movement by item for specified customers, identify trends, distribution holes and new distributions.

The system is also being used to maintain data on brokerages due. Sales volumes and brokerage receipts can be reported by customer type (grocery, nonfoods and food service) or by item type (grocery, frozen, dairy, meat and nonfoods).

Reports are produced on demand, thus eliminating the unnecessary production of paper volume. The parameters for the reports are entered by the operator so the reports can be limited to certain time periods, certain principals or certain items, Tourek said.

The data for the system is obtained from orders and invoices. Customer orders are entered on the computer, and orders are printed for mailing to the principals.

Daily and weekly reports are printed to provide order volume data and to compare this week's orders to those for the corresponding week from last year.

When invoices are received, only the exceptions to the orders need be entered. At that point, the computer captures the sales data and retains it for two years, Touret noted.

The system, which was installed in November 1975, is an IBM 32 with a 16K memory, a 9.1M-byte disk and a 100 line/min printer.

The software was developed by Computer Directions, Inc. and was designed for interactive processing, Marilyn Doig of Computer Directions explained.

Basic/Four Printer Fits Model 400 Unit

IRVINE, Calif. — Basic/Four Corp. is offering a 150 line/min printer for its Model 400.

The Model 3152 line printer features a standard 96-char. upper/-lower case capability and double-height characters. Underlining can be produced for report titles on forms up to 16 in. wide, the firm said.

The printer costs $7,900 Basic/-Four said from P.O. Box C19550, Irvine, Calif. 92713.

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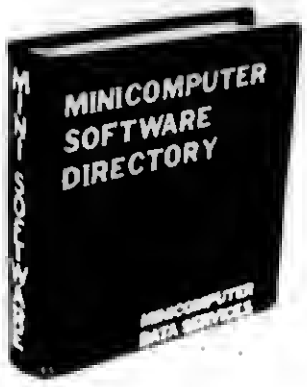

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Bicaroe System 2 Runs IBM 32 Industry Applications

CUPERTINO, Calif. — A small business system that reportedly runs IBM System 32 Industry Applications Programs (IAP) and costs between $15,200 and $24,200 is being offered by Bicaroe, Inc. through dealers.

The System 2 uses up to four double-sided, double-density floppy disk drives, a built-in CRT with 1,024 characters and either a daisy wheel or matrix printer in one desk unit.

Maximum storage capacity with the diskettes is 4.8M bytes, the firm said.

Two system control programs (SCP) are available for use with the IAPS and for programming Application Control Language (ACL), which IBM developed for use on its 3741 data entry system. An ACP occupies 16K of memory.

The Bicaroe System 2 will also run the IBM System 32 RPG II and utilities, which may be licensed from IBM, Bicaroe added.

The ACL supports a maximum of 32K bytes of user memory and provides arithmetic functions; CRT, printer and diskette I/O; keyboard entries; table searching; check digit verification and other functions, Bicaroe stated.

With ACL, the memory is segmented. An ACL translator requiring 8K bytes is also provided. Three passes of the program are required to assemble a complete program, the firm said.

The firm provides free utilities to copy diskettes, sort and merge diskettes or to use as a diskette directory and a listing of table contents.

Six Basic Packages

Six basic accounting packages are currently available free from Bicaroe: order entry, accounts receivable, general ledger, payroll, accounts payable and inventory management, according to the firm.

Bicaroe is interested in hearing from System 32 users who have developed their own programs, as it wants to build a library of programs for its users, a spokesman added.

The System 2's processor cycle time is 125 nsec. The CPU is comprised of discrete components on two 8-in. by 10-in. circuit boards. Memory cycle time is 600 nsec per 1-byte access, the firm said.

The minimum configuration machine has 24K bytes, one diskette drive, a CRT, a daisy wheel printer with a speed of 45 char./sec and a keyboard. It costs $15,200, according to the firm.

The maximum configuration consists of 64K bytes, four diskette drives, a 200 char./sec matrix printer and communications features. It costs $24,200, Bicaroe indicated.

The optional data communications feature provides bisynchronous capability up to 9,600 bit/sec.

Service is available through TRW. First shipments are scheduled to begin this month. Bicaroe is at 20730 Valley Green Drive, Cupertino, Calif. 95014.

Turnkey Handles Manufacturing, Accounting Control Situations

SANTA MONICA, Calif. — Disc/310 Corp. has an on-line minicomputer-based turnkey system for manufacturing and accounting control applications.

Based on Data General Corp. Nova or Eclipse CPUs, the system is said to handle several costing methods including standard lot costing and actual costing and to include provisions for multilocation inventories.

Other features include multilevel indented bill of materials explosions; where-used implosions; work-in-process control for either a job shop or production line, and serial number control, the company stated.

The system also handles invoicing from work-in-process by job number and serial number, time-phased material requirements planning and labor capacity planning, a spokesman said. Traditional applications such as order entry, accounts receivable, payroll, sales analysis and purchase orders are also accommodated by the turnkey unit.

A typical system with 64K bytes of memory, a 10M-byte disk drive, two CRTs and a 300 line/min printer costs $70,000 including software or leases for about $1,400 monthly under a third-party five- to seven-year agreement. "Each software system is customized to fit specific end-user requirements," a spokesman added. The company is located at 1840 Lincoln Blvd., Santa Monica, Calif. 90404.

Controller Expands Dataflux Disk Line

SUNNYVALE, Calif. — Dataflux Corp. has added another controller to its line of fixed-head disk storage systems.

Designated the DC-111, it enables Digital Equipment Corp. PDP-11 users to operate in rugged environments, the firm claimed.

The controller is available in configurations transparent either to DEC RK05, RF11 or RC11 controllers.

As many as eight Dataflux Model 980 fixed-head disk drives may be daisy-chained and run through a single DC-111 controller, to provide up to 16M bytes of storage, the firm said.

"The DC-111 makes a fixed-head disk 'look' like a moving-head disk to the PDP-11 minicomputer," a spokesman claimed. This feature allows the user to bootstrap, or self-load directly from the disk, he added.

The controller is said to be transparent to RSX-11 or RS-64 operating systems and fully compatible with the DEC Unibus.

Packaged on three DEC-type "quad" boards, the DC-111 is mounted as a four-slot system unit. This unit can be installed as a subchassis in the CPU, or else it can be ordered with a separate chassis of its own.

The Model 980/DC-111 system uses the Dataflux Disc Cell, an interchangeable fixed-head disk cartridge containing spindle, Winchester-type media and read/write head assemblies.

This cartridge, packaged and sealed to work in severe environments, is available in storage capacities ranging from .5M to 4M bytes.

The DC-111 controller costs under $4,000. As a complete outfit, the Model 980/DC-111 system is priced at less than $10,000, Dataflux said from 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

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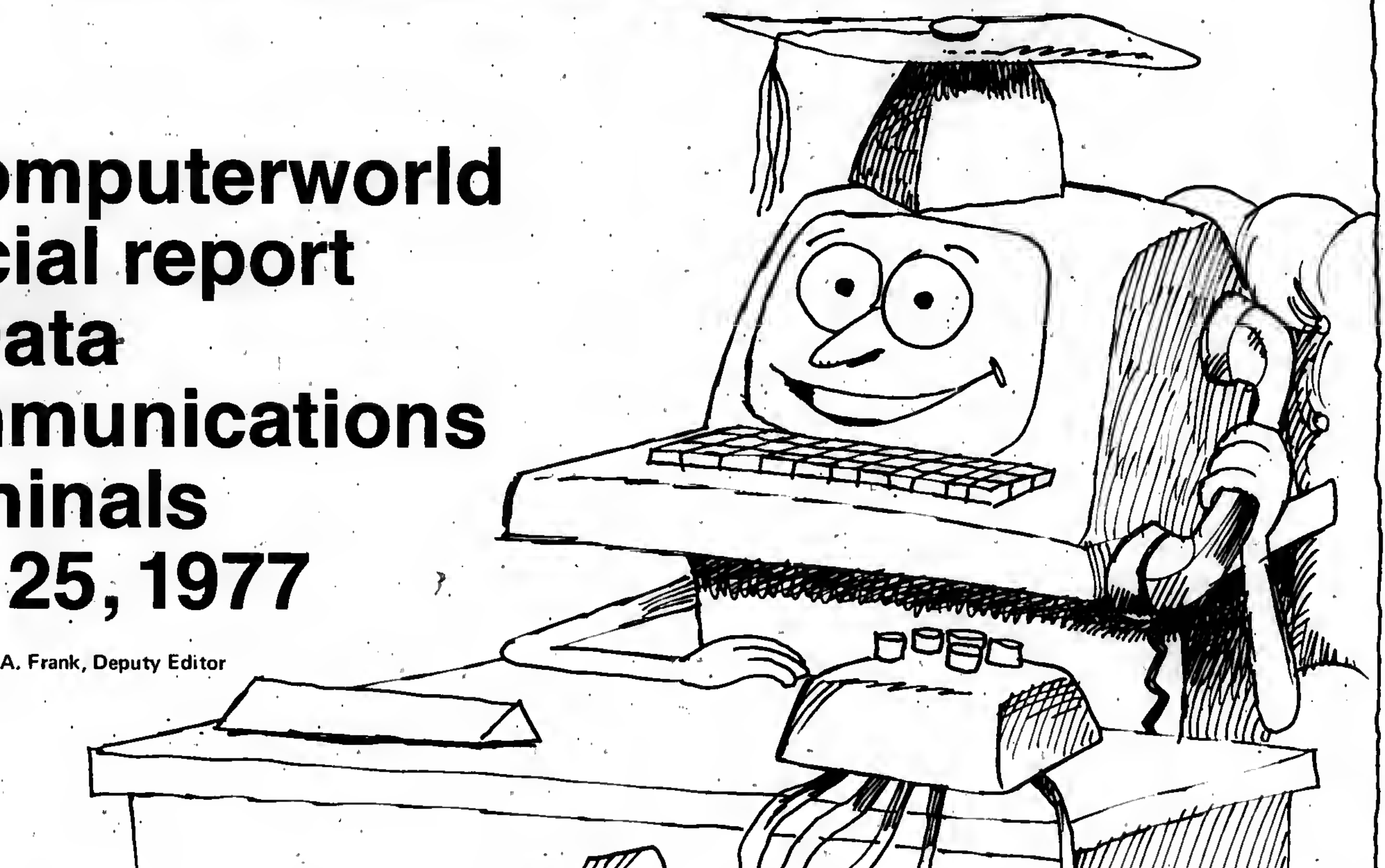
Making the most of TERMINAL INTELLIGENCE

A Computerworld special report on Data Communications Terminals July 25, 1977

Edited by Ronald A. Frank, Deputy Editor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But Present Terminals Will Stay

X.25 Standard Holds Promise for Potential Users

By Mark S. Radwin
Special to Computerworld

A lot has been written in the last two years chronicling the transition of the X.25 protocol from a proposal developed and promoted by a small group of individuals to the CCITT international standard method of access to packet transmission networks. This article will concentrate on some of the practical implications of its use rather than describing the protocol itself.

Although X.25, has been mandated worldwide as a device-independent packet mode interface for public packet networks in operation or under development, and although its usefulness is abundantly clear, it will not eliminate the support of device-dependent interfaces for the hundreds of thousands of existing Teletype-compatible, IBM 2741-compatible and remote batch terminal devices.

Clearly a public packet network cannot obsolete the huge investments in installed-base nonintelligent terminals. Even though sales of intelligent terminals are now increasing, it will be many years before they outnumber nonintelligent models.

Easy Interconnection

Although X.25 protocol terminals will not supplant existing terminals and protocols overnight, they embody a number of compelling advantages for potential users. The first striking advantage is their high degree of interconnectability to computers and application programs.

Currently most of the higher speed synchronous terminals are connected in rigid star networks emanating from single host computers. Before IBM's Systems Network Architecture (SNA) and comparable subsequent offerings from other mainframe manufacturers, an individual terminal was typically dedicated to a single application and its corresponding telecommunications access method on a single host CPU. SNA, as originally announced in 1974, added another minor dimension, permitting one terminal to work with multiple application programs on a single CPU.

Recently a further extension was announced that will allow for the interconnection of several properly configured IBM 370 CPUs. A terminal attached to the IBM 3705 front end of one CPU can connect to an application program in another through the leased lines that interconnect the 3705s of the networked machines.

Digital Equipment Corp. has gone one step further, with Decnet providing this form of network access to several DEC families of CPUs.

The packet networks to which X.25 terminals will attach provide the user with three additional dimensions of interconnectability. Interconnectability is offered to a very large number of host computers from a variety of manufacturers, a growing number of commercial and academic vendors of computing services not available in a closed corporate network, no matter how large, and an increasing number of host computers and terminals located in many foreign countries beyond the economic reach of closed networks and made available through the international interconnections of packet networks.

As all operational packet networks and those under development have announced intentions to support the X.25 protocol, X.25 has also become the most probable network lingua franca. Its suitability for this role is being advocated by the principals who championed its original adoption.

Error-Free Transmission

One outstanding advantage of packet networks is built-in error-free data transmission. Through sophisticated error detection and retransmission techniques, the network offers extremely low probabilities of undetected errors in data transmitted internally. Extending the network's internal protocol right up to the host computer interface, as Tymnet does in both its asynchronous and binary synchronous Tymcoms, completely protects this transmission link from errors.

The Achilles heel that remains in operating networks is the unprotected path between the network node accessed by the user's non-packet mode terminal and the terminal itself. Currently, most error detection is achieved by combining full-duplex network echoplexing of user inputs with character parity generation and checking by the terminal.

The X.25 protocol for packet mode terminals (or host computers) protects this final link with cyclical redundancy checks (CRC) for errors and subsequent retransmission. Thus the protocol implements total end-to-end error detection and correction by retransmission.

Because a packet network can perform character set translations, totally dissimilar and hardware-incompatible terminal types can communicate with each other.

There are a number of economic advantages to using X.25 to connect intelligent packet mode terminals to a network. The principal cost advantages appear to derive from cluster configurations, in which a moderate number of terminals are, on average, simultaneously connected through the network to various processors or application programs.

It should be noted that the X.25 protocol is, in effect, the equivalent of a packet-interleaved time-division multiplexer (TDM), allowing — in theory at least — up to 4,096 simultaneous logical connections. Although adequate pricing information is not yet available, the total cost of an X.25 terminal cluster controller is expected to compare favorably with that of a pair of intelligent TDMs and the required asynchronous network ports.

Heavily used X.25 interfaces can clearly save dollars by avoiding the telephone company's Single Message Rate Timing (SMRT) charges. In states where SMRT charges have already been levied, such as California, each locally dialed telephone call placed by a business line begins accruing a one-cent-per-minute charge after the inital few-minutes period. This new charge of 60 cents per terminal hour represents a significant monthly expense for an intensive user of network services.

With X.25, access to the packet transmission network is accomplished through a single four-wire leased line and synchronous modems. To evaluate the relative economics, a potential user should compare the cost of the leased access line and modems plus the network access charges for an X.25 port with charges for an equivalent monthly volume of non-packet mode network access and SMRT costs.

Accurate calculations, of course, cannot be made until prices for the X.25 cluster controllers and their associated terminals become available along with the tariffs for X.25 access to the packet networks. However, reasonable projections can be made, and the crossover point at which an X.25 cluster controller becomes economically advantageous appears to lie between five and 10 terminals connected on average throughout the full business day.

Mark S. Radwin is manager of operations for the Tymnet, Inc. communications network.

With 400 Terminals

Mo-Pac Tracks Railroad Freight Cars

ST. LOUIS — Practically everyone, at one time or another, has enjoyed running a toy railroad.

But consider a full-sized one with 1,100 locomotives and 96,000 freight cars in motion along 11,000 miles of track in 12 states or being loaded and unloaded at 100,000 customer sidings. Running it requires receiving 135,000 messages and sending 160,000 messages daily.

To perform the tasks which these figures only begin to describe, Missouri Pacific Railroad (Mo-Pac), one of the nation's largest railroads, has developed a computer information, communications and control system. The related software is larger in scope and more complex than that used by the nation's largest airlines or by the Apollo space program, according to Mo-Pac officials.

Called the Transportation Control System (TCS), the Mo-Pac system employs over 400 on-line computer terminals — including 91 recently installed Memorex display stations. The network also includes minicomputers throughout a vast territory that, like the railroad itself, runs from Chicago to Laredo and El Paso, Texas, from St. Louis to Pueblo, Colo., and from Kansas City to New Orleans.

The network's hub is located at the 125-year-old line's headquarters here where many of the corporate managers, accountants, bookkeepers, clerks, schedulers and customer service managers store and retrieve the information they need to run the railroad efficiently. The 91 Memorex 1377 display stations are used throughout the headquarters building.

All-Day Work

"Our new 1377s have been readily accepted by the people who use them," John Brennan, senior project manager at Missouri Pacific said. "The improved clarity and nonglare screen are easier to work with especially when sitting at the CRT the entire day."

A replacement for the IBM 3277-2 station, the 1377 CRT is designed for entering and displaying data on-line to an IBM 360, 370, 3 or 3790 communications system. In Mo-Pac's case, the 1377s are used with a 370/168.

One of its features is the screen's bottom line, which is devoted to status advise. A digital indicator here displays both the column and line location of the cursor symbol. This feature is important when an operator is required to position data on an unformatted screen, Brennan noted. The status line is also used to alert operators of the terminal's condition, e.g., System Available, Insert Mode, etc.

As cars enter the railroads system, whether from customers or from other railroads, clerks send the computer designation and handling instructions for each car. The CPU then indicates where the car is to go next. Cars are put together and the 370 is informed of their makeup. The mainframe then sends lists of trains ahead to interested parties.

Generally, only cars handled differently from the way the 370 has instructed need to be reported back. Train departures, arrivals, interchanges of equipment and other railroad events are sent to the system continuously.

Based on the continuous reporting of a large set of railroad events, it is the CPU's responsibility to keep track of every car and every train on the railroad, Brennan said. The host is also required to keep an inventory of every classification yard and many industrial areas. This information is immediately available for inquiry by anyone in the system, he noted.

Special on-line reports are available to the people who need accurate information fast. The information is also used in various accounting and management analysis reports run after the fact by an off-line processor, he added.

In addition to the display stations tied to the 370/168, about 300 other CPU links are maintained along the railroad. These include a mix of Incoterm and IBM terminals and 20 Digital Equipment Corp. minicomputers, Brennan said.

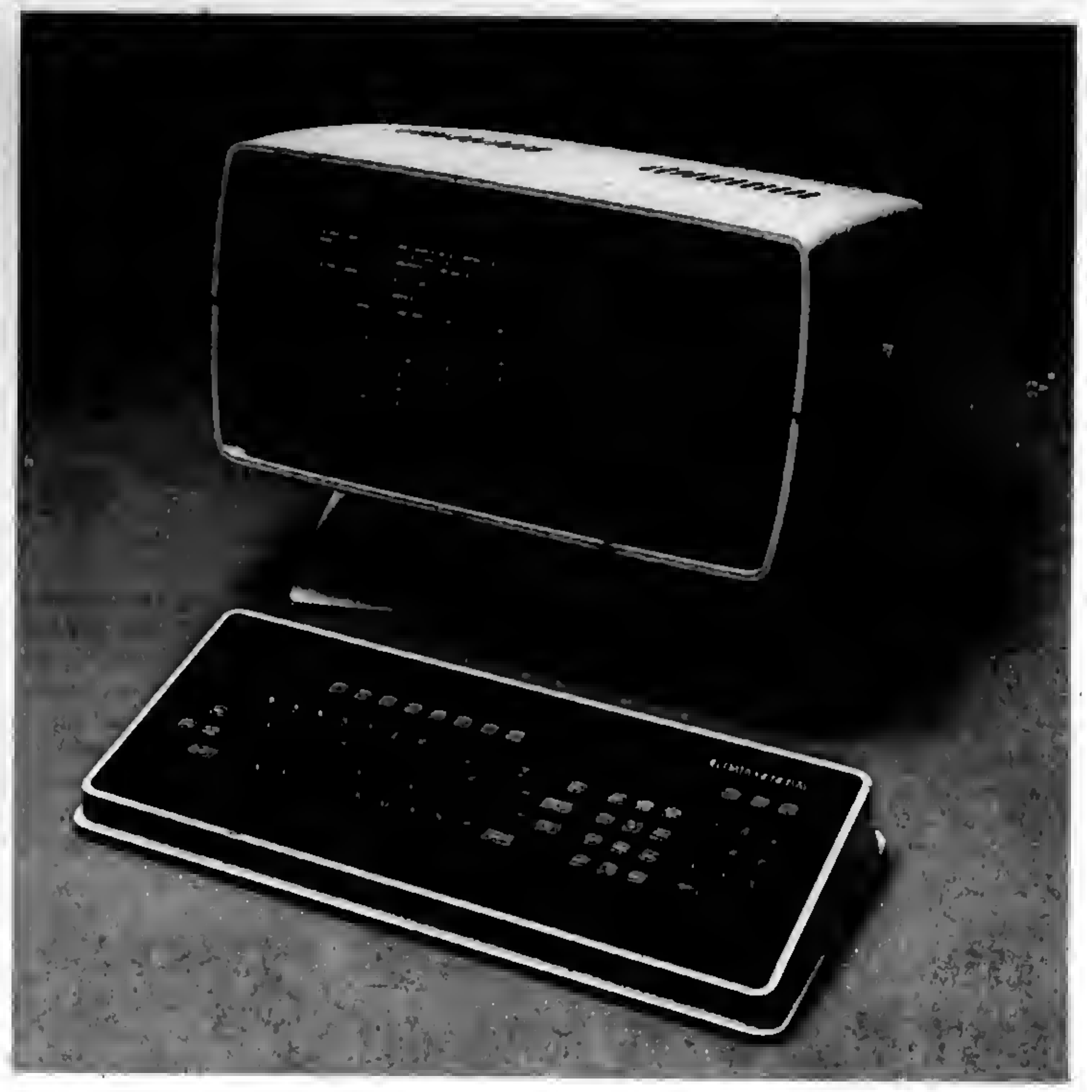
Operations control officer at Missouri Pacific Railroad's transportation center monitors locomotives, using Memorex 1377 display stations.

The terminals operate on large multidrop networks, he stated. A variety of other communications systems are in use, including full-period dedicated private lines, a company-owned microwave system and Western Union facilities. The entire system operates round-the-clock.

One place where Memorex terminals are used is in the railroad's operations control center. Three are dedicated to the department known as the operations control transportation center, which has responsibility for management of locomotives.

Ten of the display stations are also used to perform a similar task with regard to freight cars by Mo-Pac's central car control. This aspect of the still developing TCS is aimed at monitoring and regulating the process of

(Continued on Page S/6)



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Ashland Network Keeps Petroleum Products Moving

ASHLAND, Ky. — Ashland Oil, Inc. has developed a distributed data entry and processing network that reportedly will provide the company with a significant annual savings.

The network of 21 Sycor 350 intelligent data communications terminals reduces Ashland Oil's costs on each truckload of products shipped from company refineries and shipping points by reducing the time necessary to get an invoice to the customer. Former methods included either mailing or facsimile transmission of shipping documents to Ashland and preparation by keypunch for billing. Today when a customer truck leaves the refinery or shipping point with a load, the invoice will normally be mailed from the Ashland office the next morning.

Besides the time and associated cost savings, there are many other benefits from the network, according to D.H. Howard, assistant general manager of computer science and services. The actual "bottom line" savings, however, was what convinced the company to proceed with the plan developed during a 1973 study of how automation could best serve the company.

Oil Allocations

A good example of how this movement of data helped in a more humanitarian way was provided by the soon-to-be-legendary "Winter of '77." With the State of Ohio and Western New York virtually closed by bad weather, the Ohio River frozen to barge traffic, no mail moving and airports closed, the Ashland Oil data network enabled the company to allocate badly needed heating oil to hospitals, nursing homes and other priority users and tell its distributors where to send trucks to pick up oil, Howard said.

Most of the benefits from the network are not so dramatic, yet are just as important to the company, he noted. One obvious benefit was the reduction of a large keypunching job and the following edit and verification runs on the company's IBM 370/168. This represents a significant savings in people time and workload on the mainframe, Howard said.

In fact, switching the actual data entry from a central keypunch operation back to the source at refineries and shipping points has proved very successful, he stated. The user now has complete control of billing data sent to the computer, since the billing department controls the master terminal at its headquarters and the 21 terminals in the network.

The employees entering data at the source are barge and truck loaders, not computer-oriented people. Yet they have been receptive to the terminals, according to Bob Wessell, manager of invoicing for the corporation's petroleum company.

They have found the terminals easy to operate and have seen their paperwork cut significantly, now entering each shipment on the terminal only once, he noted. Under the old manual system, each shipment was logged for billing, inventory control, sales information and allocation allowance. "It's no wonder they like the new system. It has made their jobs easier and faster," Wessell said.

When a shipping point terminal is activated, it displays a function screen with 18 options from which the operator can choose the one currently needed. To process an order, the operator selects the order entry function and a screen format appears requesting a customer number, Wessell explained.

When the customer number is keyed, the 350 terminal checks its files on one of two diskettes and displays a list of products for that customer and requests storage tank numbers for those products being ordered, he said.

When the product code and tank number are entered, the terminal checks to assure that it is a valid product, used by the customer and stored in the specified tank. Finally, the amount of product shipped is entered and the entire transaction is stored on diskette.

Twice each day a master station terminal polls the network — an automatic operation, using Sycor's network control software and auto dial features — gathering shipping information for the billing department and storing it on magnetic tape. The tape is hand carried to the 370/168 for processing. Approximately 98% of all orders entered go straight through the billing cycle, a great improvement in productivity over former methods, Wessell commented.

To facilitate transmission of orders to the master 350, orders are hatched by the terminal in groups of 15 or less as specified by the operator entering an "end-of-batch" indicator. These batches are used to create hash totals which are in turn used to verify complete transmission at the master terminal, he added.

Operators at each terminal enter the products they receive and this data, combined with the shipment reports, give each location a complete inventory. Each terminal is equipped with a printer which is used to print reports including all shipments for the day, all receipts for the day, all allocations for the day, tank inventories and products shipped by product group for the day.

The terminals can also inquire into each record area for response to customer questions and for management evaluation, Wessell said. Division management can know the amounts of each product available at each location and effectively schedule sales and deliveries, he indicated.

The terminal that provides all this information includes 16K of memory, one-half million characters of storage on dual flexible disks, and an 80 char./sec bidirectional matrix printer. Ashland Oil looked at six remote job entry terminals in evaluating the project, with Sycor winning out over the others, Wessell stated.

Ashland computer science group used some innovative program modifications to enhance the operation of its network, he said. They used the overlay capabilities extensively rather than separate programs to load the 18 functions on the terminals.

To speed file search activities at the remote locations, they grouped eight customer identification numbers in one record, then created a disk address index of the records cutting average access time from 90 seconds to 10 seconds. Still not satisfied, they created a second index and reduced the average search time from 10 seconds to five, he said.

Initially they created the master diskette for each location at the headquarters allowing each location to update the master after installation.

"We want to keep the system standard except for some slight modifications," Wessell said. "No more 22 varieties of data coming in for billing. We now get a stable form and quality of information that benefits the company."

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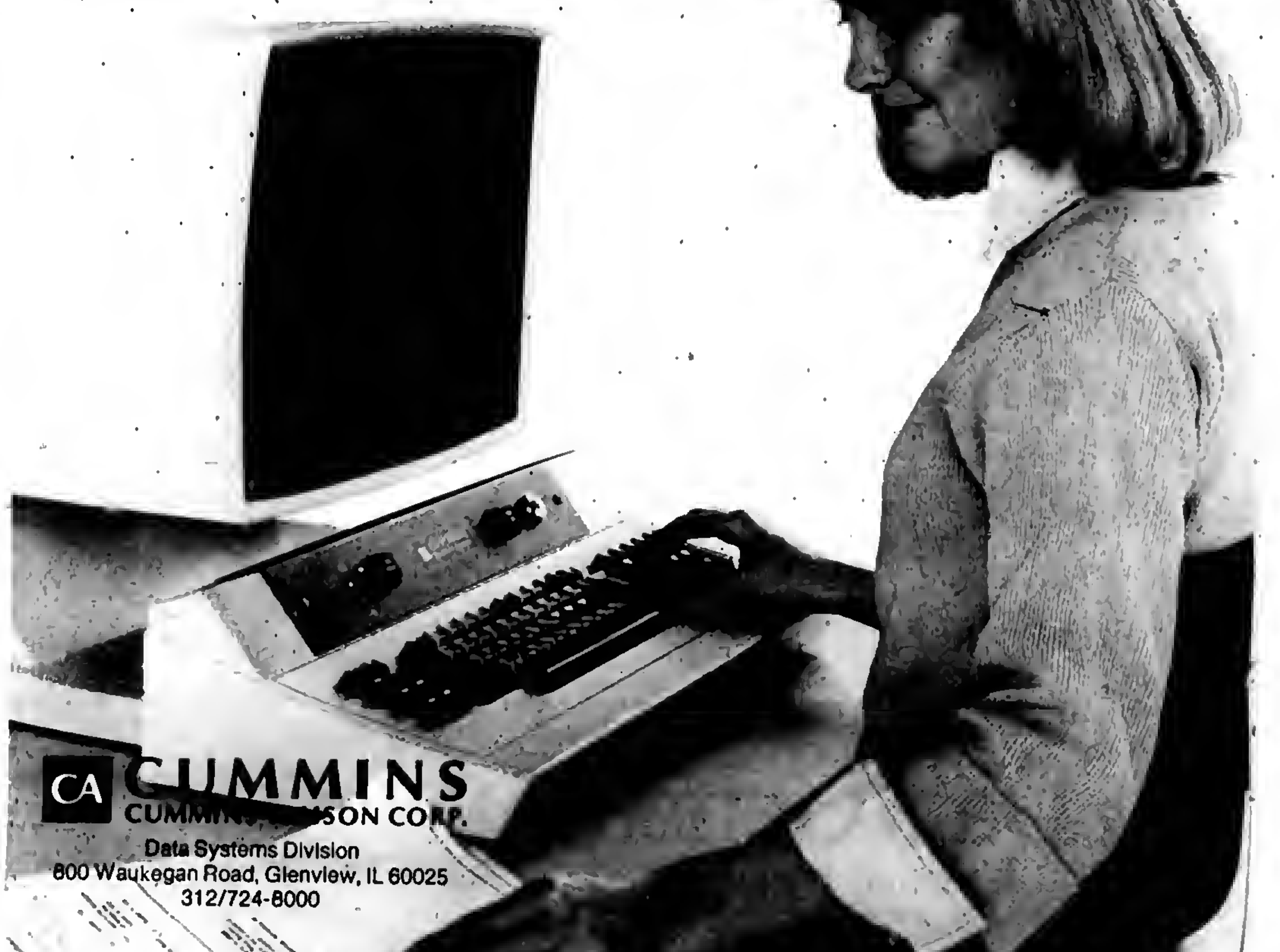

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At Dresser Industries

Single Terminal Combines Dual User Applications

ALEXANDRIA, La. — When Dresser Industries began consolidating its computer operations several years ago, Richard Womach began to create a distributed processing system using both on-line and remote processing terminals to handle his division's inventory control problems.

Three years later, Womach, manager of information services for the company's Industrial Valve Division, and his Alexandria Information Management System (Aims) have already hit their three target objectives.

Using the Data 100 Model 82 remote display system, Aims has provided increased control of the company's inventory of more than 55,000 parts, yielded a threefold improvement in the operation of manufacturing systems and maintained modest manpower increases in an operation which has experienced significant growth in output volume, Womach said.

Card Bound

In 1973 when Womach transferred from the corporation's Maryland division, there was no such system. An 80-character-bound, card-oriented IBM 360/20 was doing financial applications but was not "addressing itself to the real needs of the company," Womach noted.

"There was no automated material requirements planning system," he said, "and the manually maintained records could not keep pace with the problems of managing the relationships among a 200,000 item bill-of-material — problems only magnified by material shortages and extended vendor lead times."

Those problems, exacerbated by a Cardex system to handle 50,000 inventory transaction cards, put the Alexandria division at least a month behind in figuring out where it should have been and more than two months behind in producing customer acknowledgments.

To make more effective use of Dresser's computer horsepower (IBM 370/155 and 165), Womach selected a Data 100 Model 78 systems processor which was capable of handling tape and communicating with the mainframes, as well as handling the future volumes of data Dresser anticipated.

To build the data base stored on the company's computers in Pittsburgh, as well as continue with the everyday operations — a process which took nearly 18 months — Womach assembled a battery of IBM 3741s to enter the parts master file, bill of materials, 25,000 routing assignments, 4,000 manufacturing orders, 8,000 purchase orders and 45,000 customer orders.

The data was then converted by a diskette reader to 9-track, 800 bit/in. magnetic tape and hung onto the Model 78 for transmission at 9,600 bit/sec to Pittsburgh for processing and storage. Hard-copy reports were provided by the Model 78s, 125 and 600 line/min printers.

CRTs for Updating

With the initial application in place, Womach began to install IBM 3270 CRT terminals in the user areas to access and update the manufacturing files resident on the CPU.

This was done, he explained, not only to cut down on the growing mounds of paperwork, but to make the system as responsive to the user as possible. Forms which were previously handwritten and then keypunched and submitted to the job queue were now key-entered on the CRTs and transmitted directly to the mainframe, which updated the files every four hours.

After nearly 18 months of experience with the 3270s, however, Womach began to recognize the single function limitations of his on-line data acquisition system, and, once again, opted for Data 100 — this time its 3270-compatible Model 82 remote display system and an eight-station Keybatch system. "When the 3270's weren't being used for inquiry," Womach noted, "they just plain weren't being used."

The advantage of the new system, Womach said, is its multifunction capabilities. When the Model 82 is not being used for on-line inquiry or data acquisition, he noted, it is handling off-line data entry tasks in conjunction with either the Model 78 or the 5M-byte Keybatch system. Peripherals, including 600- and 125 line/-min printers, are likewise shared among the three systems, In effect, lowering the cost of the overall system.

"Having the same piece of equipment doing multiple functions," he said, "with multiple backup is a real boon to users at our various terminal locations." The end-users, apparently share Womach's enthusiasm; since the on-line network was initiated, the number of transactions has risen from 6,000 a month to more than 100,000 per month presently.

"With our on-line system," Womach said, "we now know immediately if we have a problem with deliveries — whether coming into or leaving the factory — and that has helped us control our inventory and maximize our efficiency." The improved visibility — never more than four hours old — has also allowed Dresser to schedule production in the proper priority sequence to balance stocks and improve the flow of work on the assembly floor on a continuous basis.

Better DP Coverage

Judged against a corporate checklist for manufacturing systems which specifies 12 items — from engineering and production data control, to capacity planning, to the order entry procesing, to purchasing — which Dresser believes is the best possible DP coverage, Alexandria scored an 87% performance rating vs less than 30% before Aims.

No Increase in Staff

Another big advantage to the system, Womach noted, was that while the number and sophistication of applications have increased tenfold, and sales revenue for the Louisiana division has doubled in the past three years, the number of people needed to maintain the records has increased only 19%.

With all of his equipment in place, Womach is now taking aim at a sophisticated "pass-through" network which would store the most commonly used data locally while maintaining the balance of the data base at the CPU.

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Microprocessors Will Foster More Intelligent CRTs

By Barry Kelman
Special to Computerworld

Microprocessors are rapidly replacing hard-wired logic as a means for control in interactive and editing terminals. Micros are even replacing minicomputers as controllers for intelligent terminals. Ever since microcomputer-based CRT terminals were introduced there has been a steady stream of new micro products into this area.

Three types of CRT terminals currently exist in the industry: interactive, editing and intelligent. Each type of terminal fulfills a distinct set of user requirements.

The interactive terminal is most frequently used in time-sharing or conversational situations, an environment requiring frequent access to data for inquiry or addition. Since the data is not processed, there is no need to hold the information for massaging or updating.

In applications requiring minimal amounts of processing along with editing and update capabilities, the editing terminal is more practical. Due to their increased storage capability, editing terminals allow the remote user to access and update information.

An intelligent terminal is basically defined as one which allows the user to program the terminal. Some intelligent terminals allow only remote job entry, requiring the programs to be loaded from the host computer. Other intelligent terminals allow the user to program, test and compile at the terminal. As long as the processing is performed by the terminal itself, that terminal is intelligent.

True Intelligence

With the use of microprocessors in all three types of terminals, even the most basic "dumb" terminals have intelligence. Micros can be found performing quite sophisticated multitasking terminal control operations. But these terminals cannot be considered "intelligent" in the traditional sense of the word. This intelligence is used to perform a fixed task and is not user-programmable.

This new source of intelligence in computer terminals is not available to the end user: it is not programmable.

Additional hardware and an appreciable amount of memory would be necessary in the interactive and editing terminals for the microprocessor's intelligence to become available to the user. Read-only memory (ROM) can be more expensive than the CPU.

A more complicated screen interface and keyboard than are now found in nonintelligent terminals would also be necesary to make these terminals programmable. And the costs of all these improvements would be self-defeating.

It would be impractical to upgrade an interactive terminal to an editing or intelligent version as user needs change. Replacing logic board arrangements, keyboards and option selection hardware are involved. By the time the user upgraded these components, the terminal's entire electronic package would have been replaced.

Certainly, the microprocessor-based terminal trend will continue. The benefits of this advanced technology are numerous, especially at the system design and programming levels.

System designers and programmers are finding that many capabilities formerly offered as "pay-extra" options are now included in the basic purchase price of the terminal.

Terminal software is becoming more sophisticated. The system designer and programmer are finding their jobs much easier.'

Kelman is manager of software development, Perkin-Elmer Data Systems, Terminal Division, Randolph, N.J.

Mo-Pac Freight Cars Tracked Through Memorex CRT Net

(Continued from Page S/2)

matching empty car supply with demand.

By maintaining an up-to-the-minute inventory of the current supply and demand for empty cars, the mainframe assists in making visible the car distribution plan and in communicating distribution decisions to yard offices. Upon receipt of reports of empty cars, the 370 scans the list of outstanding orders for cars to find appropriate ones for the assignment.

One of the ways that TCS has reduced the costs of running the railroad has been a 10% to 20% reduction of the time that "foreign" cars (those of other railroads) spend on Mo-Pac rails, he indicated.

"We receive foreign cars at an interchange point and we may take them to the other end of the system to another interchange point. The faster we can move these cars back to the owner the better, since we are charged a rental rate based upon each car's value," Brennan explained.

Another advantage of the system has been an increase in cash flow, he said. The TCS's autobill feature makes it easier and faster for the railroad to produce shipping documents.

Railroad's transportation center answers customer questions using CRTs to access shipment records.

Here, 20 of the display terminals are used in the regional accounting office. Other Memorex units are scattered throughout the headquarters building for use in inquiry, administrative message switching and management and control of piggybacks (truck trailers) on the railroad.

The Memorex stations were gradually installed in the facility over several months, replacing about the same number of similar display stations from another vendor.

"The predecessor CRTs, which we had purchased, were sold to a broker. That money covered the cost of the Memorex 1377s. The bottom line of the transaction was our obtaining a better and newer station for no cost," Brennan claimed.

"We considered several plug-compatible display stations. Crispness and quality of the display, feel of the keyboard, maintainability and price were among the main factors we weighed," he added.

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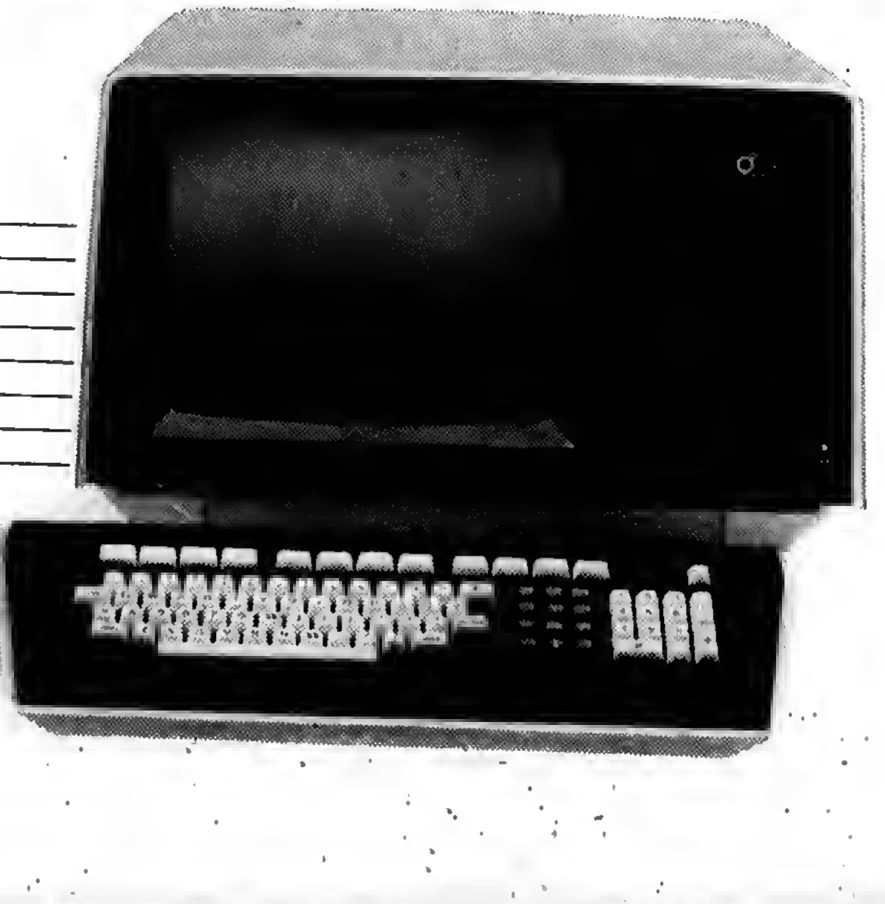

Connected to CDC Mainframes

Multi-Vendor Terminals Help Design Nuclear Plants

By Mal Stiefel
Special to Computerworld

SOUTHBORO, Mass. — Yankee Atomic, designer of nuclear power plants for its parent New England Electric System, combines on-line and remote batch terminals (RBTs) tied to Control Data Corp. 6600 and 7600 computers on the Cybernet timesharing network to serve its engineering staff.

The system, including four Digital Equipment Corp. LA36 Decwriter terminals, eight Teleterm 1030 portable terminals made by Computer Devices and two Harris Data Communication RBTs — a Cope 1200 and a Model 1620 — supports such applications as core and reactor design, nuclear fuel management, safety analysis and structural design.

The system is also used for radiation analysis, based on readings taken from badges worn by all workers at half a dozen New England Electric nuclear power plants.

The 1620 RBT is used in dual Hasp emulation mode. It is connected all day long to Cybernet centers in Rockville, Md., and in Minneapolis over 9,600 bit/sec lines. When the operator enters a job through the 1620, he designates which computer to use and the terminal places the data on the proper line.

The Hasp protocol, acquired three months ago, replaced a UT-200 emulation package. With Hasp, data compression is improved and two RBT peripherals can be used for output at once, according to company spokesman John Vossahlik.

Under UT-200 emulation, only one output device could be addresed at a time, Vossahlik pointed out. Thus, if one job required output to be routed to the Calcomp 936 drum plotter tied to the 1620, and the following job required a printout on the 1620, the printout would wait until special characters inserted in the data stream by the host computer signaled the end of the plotting job.

Alternatively, in the present system, two printing jobs can run at once, since the 1620 configuration includes two line printers.

With Hasp, the data streams for the two local output devices are interleaved, Vossahlik continued.

Both Hasp and UT-200 support interleaved communication to two different computers from the 1620 terminal.

Speedy Delivery

Some interactive terminals are located in engineering offices in Westboro, about a mile from the RBTs in Southboro, and in other Yankee Atomic facilities. Since output for most jobs that originate at the interactive stations is sent to the RBTs, a courier service connects the Westboro and Southboro plants to speed delivery of output to users.

In addition, an edit routine allows the user to send selected critical details or summary statistics back to his own interactive terminal for a "quick look," while the bulk of the output is sent to the RBT.

The interactive terminals, operating at 30 char./sec, can't absorb masses of data, Vossahlik explained.

Several years ago, before the terminals appeared, Yankee Atomic employed students to bring job decks from its Boston office to CDC's public terminal in Cambridge. The first in-house terminal, shared with the parent company, was a 2,000 bit/sec UT-200. It was quickly outstripped, so Yankee Atomic replaced it with the Cope 1200 in 1973.

Again the demands on the system grew. The company considered bringing a computer in-house but decided against it. Management felt the company couldn't risk failing to meet deadlines for critical reports because of a computer outage. So they brought in a CDC 734 RBT in 1975, running with a 4,800 bit/sec dial-up line to beef up the installation; the Cope 1200 stayed on.

Unfortunately, the 734 "couldn't take the beating," Vossahlik said. A Data 100 terminal was considered briefly before the company turned back to Harris last year for the 1620.

Over time, the 1620 has taken on additional core — 65K bytes in all — communication hardware, the plotter and a tape drive to reach its present capability level.

To round out the system, the interactive terminals were acquired 18 months ago, when the RBTs were moved to Southboro from the Westboro plant.

Nuclear Advisor

Yankee Atomic plays several roles as a service organization supporting the parent company, New England Electric System, and its constituent utilities: New England Electric Co., Northeast Utilities and others.

Yankee Atomic is primarily responsible for nuclear power plant engineering; it also operates the nuclear power plant in Rowe, Mass., and it assists and advises the operators of other nuclear plants in New England.

The company's responsibilities in power plant engineering include development of requirements, environmental studies and the furnishing of data to the federal government's Nuclear Regulatory Commission, Vossahlik said.

Thus, as a contractor like Westinghouse, General Electric or Combustion Engineering develops plans for a plant, Yankee Atomic will look over its shoulder, checking calculations, using independent methods to verify the contractor's design.

Several software packages are used on the Cybernet network in these computations. For example, the PDQ program, part of the Lifetime Evaluation and Analysis of Heterogeneous Systems package, is applied in core and reactor design and in establishing initial fuel loading for the plant.

Structural analysis is carried out with Stardyne, an engineering package.

The Relap-4 and Loca programs are used to determine whether safety devices will protect the plant, personnel and the surrounding community in the event of an accident, Vossahlik said.

The radiation analysis system, developed in-house, includes a data base of cumulative lifetime radiation of individuals employed in the nuclear plants, he added.

Mal Stiefel is a staff member at the Mitre Corp., Bedford, Mass.

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Intelligent Terminals Impact Multiple Applications. . .

The trend with today's data communications terminals clearly is from dumb terminals to intelligent and from a single medium to multimedia.

Terminals are growing in intelligence and function, increasingly guiding users when they input data, editing transactions and storing data at the terminal. Many of today's terminals have integrated communications control and network interface capabilities to peform tasks which were previously done by separate components.

New terminals can be both multiapplication and special-purpose. The current crop of Electronic Funds Transfer terminals are highly special-purpose and are usable for little else. At the same time, general-purpose CRTs with printers can, through their intelligence, perform a wide variety of functions programmable by the end user and serve both specialized and generalized applications.

Terminals are increasingly modular. Users can buy plug-in circuit boards to increase the function or capacity of the device or expand its media. They can select sensed, keyed, verbal and/or scanned data entry and can have displayed, voice printer and/or facsimile output.

The cost of terminals is decreasing. Basic terminal elements (e.g., casing, power supply, display) account for a major proportion of terminal manufacturing costs today. Unit costs are fairly stable, ranging from under $1,000 to $5,000 depending on capability.

The cost of an intelligent terminal is rapidly approaching that of a dumb one. The electronics (logic, memory) don't add much cost to the device. Consequently, newer terminals give users more "smarts" for the same dollar.

Terminals are becoming a rising and more obvious portion of total system costs as the number in use grows and as other system components, such as the central processor — that big machine back at the home office — drop in cost more rapidly.

There are three major implications of the technological trends affecting terminals.

First, planners and users of terminals should deploy more capability at the terminal level. That's almost a truism today, but it is backed by solid benefits, including lower network costs, less reliance on a central computer and higher reliability.

Second, users should isolate changeable functions (such as formats, input data that is dynamic and not absolutely fixed) in programmable read-only memory, if they are using that type of device, or in functionally discrete software modules.

More importantly, users should invest now for future flexibility. New uses will be developed for the terminal after the immediate objectives are attained.

Furthermore, an intelligent terminal is unlikely to impact only one application area. Work flows and communications patterns will change, generating new applications such as word processing. If users plan ahead for flexibility, they may be able to "piggyback" new uses on the devices they install now by adding modules instead of replacing devices.

In addition, terminals may need to share networks with nondata applications. Perhaps the terminal itself may be used for or act as a controller for such nondata as electronic mail or facsimile transmissions.

Transmission Techniques

With transmission links (the "wires") the trend is from private (or leased line) to public (switched or shared lines) and from analog to digital transmission techniques. Many new services will use digital transmission technology and the market will support a number of shared, public networks.

For example, users can choose between Bell's Digital Data Service and Southern Pacific's Datadial (based on Datran's original service). In addition, private microwave nets are being set up by large users or by users with a high volume of data to transmit from one building to another.

The packet and specialized message-switching services, such as Telenet or AT&T's Transaction Network Service, are another proven and growing area of communications.

Satellites are increasingly being used by commercial users who now can lease fixed "lines" through Westar and others and will soon be able to share demand assigned circuit capacity from several vendors as well as the new Satellite Business Systems venture.

Higher bandwidths and faster speeds characterize the trend.

Integrated switching disbursed throughout the network and fast connection times for switched (shared) services are also in the offing. Today, for example, Telenet and Tymnet can, from the time the last destination characters are received at a node, establish a path to the destination within 300 msec in most cases. That's fast switching. This kind of speed makes switched services viable alternatives to private-line networks.

Use of networks is changing. Where in the past the usage profile on communications lines tended to be continuous, now it is becoming more erratic and sharply

(Continued on Page S/11)

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(Continued from Page S/8)

spiked. The reason is that there is a lot of interaction between the operator and the system occurring at the terminal.

Then, at some point, the terminal accumulates a block of information and wants to transmit it or it needs to "talk" to somebody else (another terminal or a computer), resulting in a burst of exchange between the terminal and the remote point, usually at high speed. This sequence is followed by more continuous interaction between the operator and the terminal, another burst exchange and so on.

The cost of transmission is declining, but much more slowly than other components of the system. The costs are becoming usage sensitive (such as recent and proposed Wats tariff changes) and distance insensitive (in private-line services as well as Wats).

While costs have dropped, recent and proposed changes (Telpak elimination, revised individual private-line rates and Wats restructuring) have shaken the foundation of transmission and made it necessary to rethink the entire approach. As a result, communications link costs are becoming a larger, more visible and much more critical portion of total system costs.

One of the implications of these trends in transmission links is that a wider variety of options need to be evaluated. In addition, dedicated application and network communications links tend to be inefficient and thus costly so they will be less prevalent in the future, especially since the electronics needed to control shared use systems is dropping in price so dramatically.

Planners need to build in enough flexibility to interface several transmission services with varying protocols and varying speeds. This is technically feasible today using intelligent interfaces.

Planners should consider shared systems or shared links for developing "bursty" applications.

The trends in network architecture and protocols include the following:

Star networks are phasing out. They cost too much and expose the entire network to failure of a critical component. This centralized architecture doesn't conform to the way businesses want to organize and run their information systems.

There is a tendency toward ring networks, such as onsite rings or digital loops, with IBM's logical loop interface as an example, or offsite rings, such as the packet services — some large-scale users are building their own packet rings where they have several processors to link together.

There is also a trend toward hierarchical networks and, of course, hybrids.

More and more users are interested in high-level, unified communications network architectures such as Honeywell's Distributed Systems Environment, IBM's SNA and Digital Equipment's Decnet. Control protocols are becoming standardized. For example:

- The packet protocol seems to be favored by advanced users and for good reasons. There are some inefficiencies involved but the standard interface discipline it imposes more than offsets any inefficiencies or extra costs. The international standard X.25 is the protocol the world appears to be settling on.
- There are specific high-level data link controls such as Synchronous Data Link Control, High-Level Data Link Control and Burroughs Data Link Control. People are beginning to use them, but usually only when needed to use a desired terminal.
- Of course Bisync will be with us for some time to come, so networks of links and processors will need to interface various protocols. For example, most large organizations will have a line that has a Bisync terminal on it and will want to plug it into a larger network that is basically a packetized ring network.

There are several implications of these trends in terminal network architecture and protocols.

First, users should separate the communications networking functions from applications characteristics. Users probably should dedicate a set of processors to network functions — don't let the applications get mixed up in them.

Users should integrate separate networks to reduce the redundancy of communications facilities throughout the organization. To do this, the network should support a variety of processors and terminals operating diverse applications.

Users should plan to provide a rich variety of services and service levels within the network to create a single service with multiple potential uses. This serves the dual purposes of economy and maximizing the possible communications paths to foster a freeflowing interchange of information.

Lastly, users should maximize architectural and protocol compatibility to make all this diversity work together. One way to manage diversity and change is to set up a generalized network with increasing application specificity accomplished through hierarchical layers of terminal hardware and control protocols.

This article was based on a recent presentation by staff members of the consulting firm of Booz, Allen & Hamilton, Inc., New York.

"With Sycor 440 terminals, we increased productivity 43%."

Jim Millington, Project Manager
Chicago Title Insurance Company

Chicago Title Insurance Company, with more than 160 offices and 1600 agents, provides title insurance on real estate nationwide. This kind of insurance increases speed and efficiency in completing real estate transactions and protects against loss due to title defects. Chicago Title issues over 600,000 of these policies per year.

"Historically, title records have been kept by hand," Project Manager Jim Millington says, "but the volume of title actions in many densely populated areas demands speed and accuracy that handsearch simply can't deliver. That's why we developed OPTICOM — a computerized system for indexing the name and land records essential for providing title services — and made it available to our branch offices and agents.

The Sycor 440 tackles the heavy-volume areas.

"OPTICOM — which includes the Sycor 440 — is the most cost-efficient way we've found for handling heavy volumes of title actions," Millington explains.

"Information about a specific piece of property or about individuals is stored on the 440's 10mb disk. The data is entered on terminal display stations with eight special formats which cover each type of action concerning a piece of real property. The terminal controls formats and guides the operator, so data errors are almost completely eliminated.

The Sycor 440 makes instant name searches.

"In addition to collecting, editing, verifying and sorting all our data," Millington notes, "the Sycor 440 also lets the Chicago Title branch or agent make name and property searches against up to 30,000 current records. Instantly.

"But the real payoff is that our users get more work done faster. Our studies show that they've been able to increase productivity 43%. And the Sycor 440 requires less-experienced people to achieve this productivity level.

Sycor 440 reduces operating costs.

"Our increase in productivity and Sycor's attractive lease structure help us hold down operating costs," Millington reports. "And in addition to the daily capture of OPTICOM tasks, we also maintain our accounts receivable and customer name and address files by using data entry programs on the Sycor 440.

"The records created by OPTICOM and these data entry programs are transmitted daily to Chicago Title's CPU for processing. Reports generated and updates to the OPTICOM file are transmitted back to the local 440s overnight. We feel that this approach to distributed processing is the most economical way to provide our users with timely information. I'm really pleased with the 440's performance."

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Optimal Terminal Selection Process Held Vital For Efficient Network

By Dr. Howard Frank
Special to Computerworld

Data communications systems are playing an ever increasing role in today's corporate and government environments. Network planners are beginning to realize the importance of overall planning and design of these systems.

There is increasing acceptance of the network planning process which involves such steps as problem definition, requirements analysis, feasibility studies, technical strategy evaluation, analysis, design and simulation, system specification, acceptance testing and operations and maintenance. However, few users realize the importance of including terminal selection within this planning environment.

The goal of the data communications manager is to provide the most cost-effective system which meets the needs of users. In fulfilling this goal, the manager generally attempts to integrate various aspects of the system.

Network integration may occur at a number of conceptually distinct levels. For example, sharing of common carrier facilities by multiple users on FX lines, Wats lines and so on are readily used approaches. Until the recent Telpak tariff elimination, large users were able to make efficient use of a tariff structure to integrate their communication requirements.

A more detailed level of sharing involves the use of common functional communications devices and their associated communication lines. Examples of such devices are concentrators, message switching processors and packet switching nodes.

Another approach toward integration is the sharing of multiplex facilities and their lines. This sharing is often very effective in reducing network costs.

At a more detailed level of integration, there is sharing of ports, modems, terminal controllers, the terminals themselves, space and staff for facilities and the sharing of application programs and computing resources.

Integrated Functions

An alternative approach to sharing is the integration of the planning and management functions across the entire spectrum of data communication activities. Via centralized management, cost savings can be realized from discounts available for bulk purchases, the overhead associated with procurement, billing, facilities maintenance and recordkeeping can be reduced, and sufficient technical expertise can be amassed in one place to plan properly.

In this area, the selection of proper terminals, combined with the design of the communication system can also make a major impact. To illustrate this point, the following example is taken from a real-life situation.

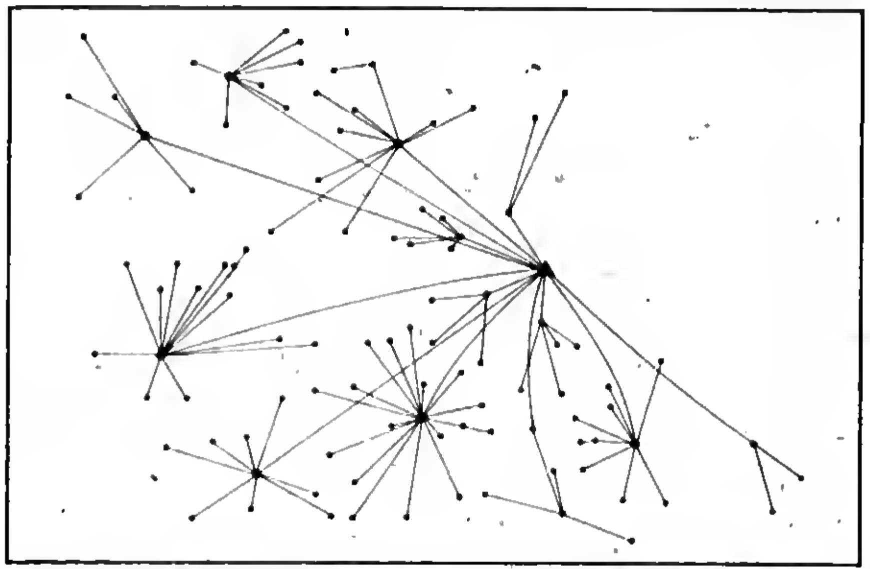
The system considered is a time-sharing network which was developed to provide services to approximately 1,000 terminals distributed over a wide geographic area. The system had been designed in two stages.

A communications network was developed based on the use of multiplexers distributed remotely from the central time-sharing computer. Users would access the central computer by dialing in to the nearest multiplexer using in-Wats or FX lines. The selection and payment for terminals was left to the end user.

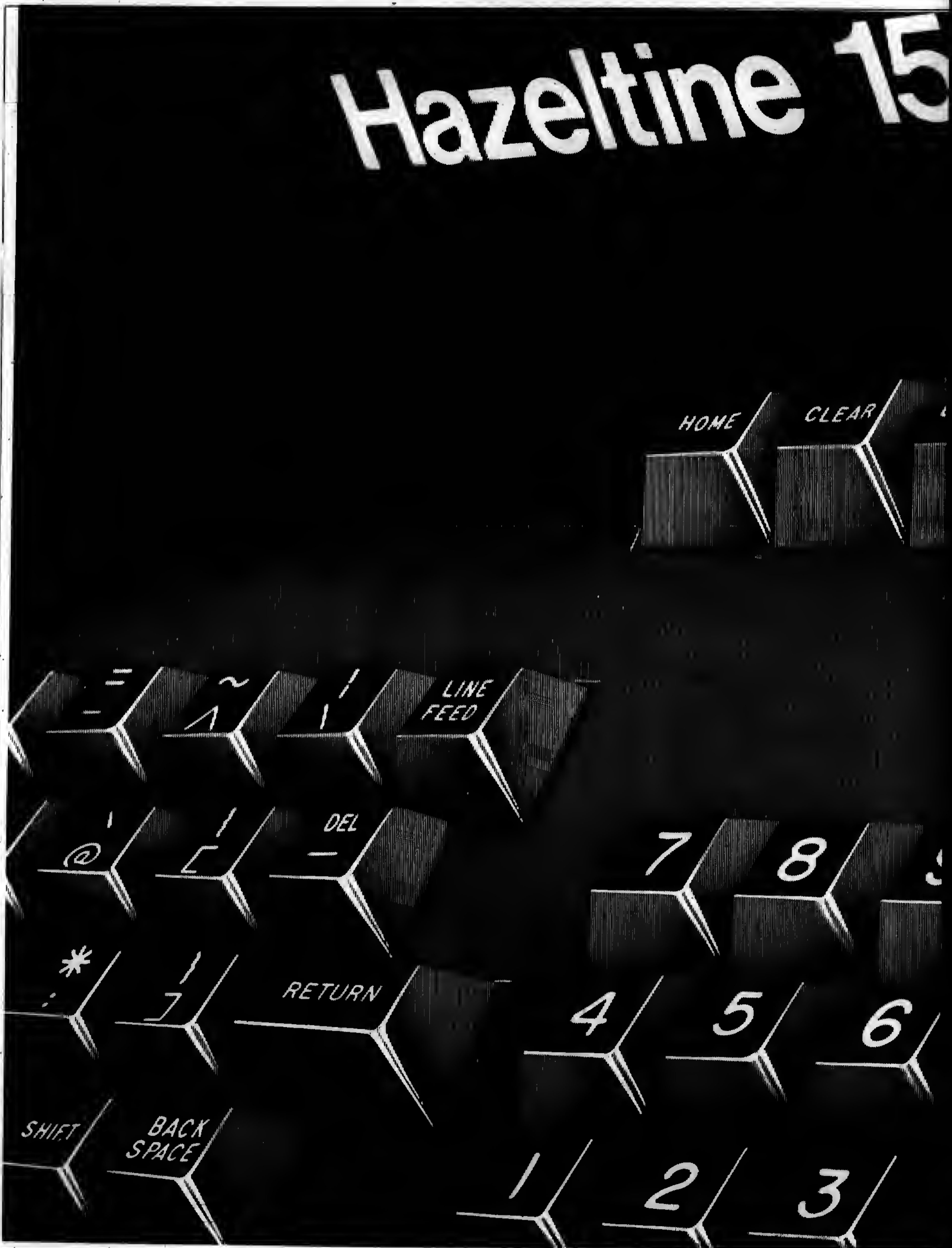
The result of this partition was that virtually without exception, users chose the least expensive terminal which could be employed within the system. This terminal invariably was a simple low-speed (non-CRT) printing terminal. The fragmentation of the planning and design problem thus led to a system which had a generally low-cost terminal population, but a high-cost communication network.

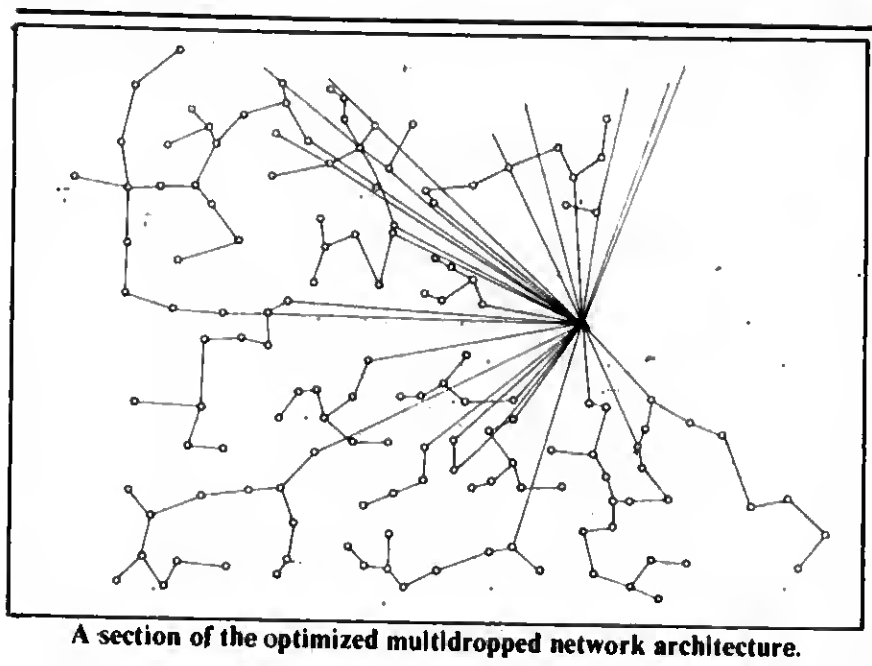
Unfortunately, after implementation of service, users began to experience dissatisfaction with the speed and quality of their ter-

(Continued on Page S/13)



A section of a multiplexed network with low cost terminals and a high cost communication network.





A section of the optimized multidropped network architecture.

Networks Depend on Terminal Selection

(Continued from Page S/12)

minals and began to upgrade to high-speed devices. Within less than a year of operation, it became apparent that many of the low-cost terminals would shortly be replaced by higher speed CRT devices. The resulting trend was toward a high-cost terminal population with the high-cost communication network that had been developed to serve the more primitive terminal population.

The alternative to the above situation was one in which the communication network planner selected both the terminal and the network design. An optimization study led to a numher of interesting conclusions about the best communication network structure and the proper management structure within which to make planning and purchasing decisions.

This study considered the uses of alternative communication techniques for serving the time-sharing terminals. In particular, the study considered the use of multidrop communication lines with higher speed, buffered terminals sharing these lines.

The conclusion reached was striking. If the network planner had control of the terminal selection as well as control of the network, an entirely different network architecture and terminal selection would have been made. With this different architecture, the planner would have been able to achieve, for the same cost, a system with high-speed terminals instead of one with low-speed terminals.

To achieve this, several decisions would have been made. The terminals selected for the current system were Model 35 teletypewriters with speeds of 10 char/sec. These terminals are not capable of responding in a polling environment. In order to operate in a multipoint environment, the terminals must be upgraded by adding huffering and addressing capabilities and their modems must have higher speeds.

An alternative would have been to make a different terminal selection (e.g., buffered CRT devices) at the beginning of the network planning process. For this selection to be cost-effective, either the incremental cost of the terminal must be offset by the communication cost savings derived from the multipoint configuration or the users must be willing to pay for the greater capahilities of the new terminal.

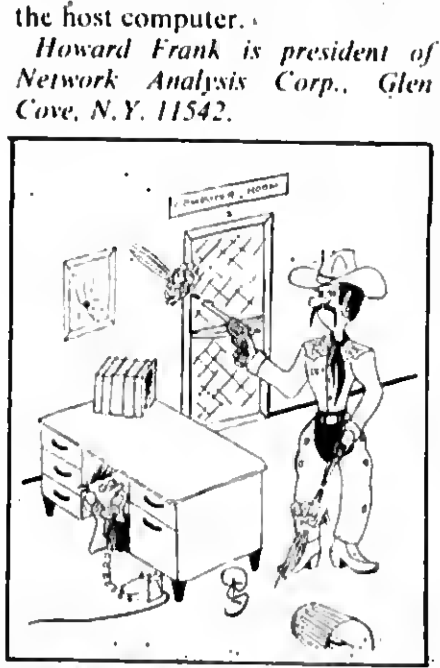
The total cost of the terminals with greater capabilities would have heen met hy the savings achieved hy the multipoint network as compared with the multiplexer system.

Based on the existing system constraints, the communications cost for an optimized multiplexer system was ahout $50,000/mo. The multipoint line configuration reduced the communications costs hy ahout 50% or $25,000/mo. Moreover, projections of future traffic requirements increased the ahsolute savings of the multipoint versus the multiplexer approaches to over $38,000/mo.

These savings, when equated to the potential dollar pool available for terminal enhancement via either capital expense or lease, generates an amount greater than $1.5 million. This pool would amply cover the cost of the terminal enhancement, thus providing substantially greater terminal capability with no additional total system cost.

This example is typical of many systems. It illustrates the benefits of a comprehensive network planning process which includes in its domain all elements of the system ranging over the user terminals, the communication network and the host computer.

Howard Frank is president of Network Analysis Corp., Glen Cove, N.Y. 11542.



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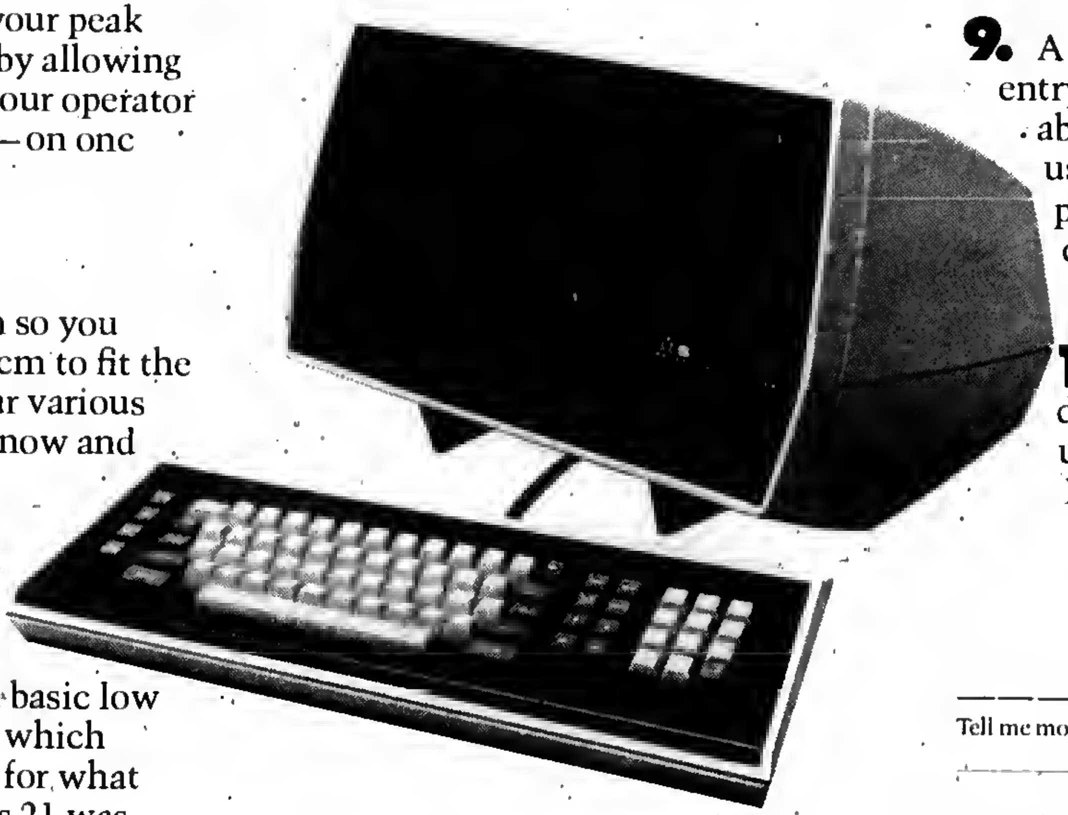

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Off-Line Terminals Handle Chilton Subscriber Data

RADNOR, Pa. — By 3 a.m. on the morning after each of the three Presidential debates, an IBM 370/145 here had processed the results of nationwide voter opinion surveys conducted by Chilton Research Services, a division of Chilton Co.

The surveys were among more than 300 Chilton completed last year for clients in business and government. Like most of those surveys, the opinion polls which followed the Ford-Carter debates were conducted by telephone.

"We have more than 40 IBM 3277 CRT terminals connected directly to our computer," explained James Wyatt, operations manager for Chilton's Management Information Services department. "Typically, our interviewers enter response data directly into those terminals during phone conversations, prompted by messages displayed on their terminal screens," he said.

"Because of the need for fast turnaround, we employed more than 100 interviewers to sample the reactions of voters throughout the country immediately after each debate. We did not have enough terminals to use the on-line system," he noted.

Instead, interview results were prepared for the computer on an Inforex 3300 terminal system, according to Wyatt. "That's a good example of the way the 3300 supplements our on-line system," he said, "not only for our market research operation, but for other applications as well."

Uses Microprocessors

The 3300 includes a terminal control unit which employs microprocessors for the validation of entered data. The control unit can accommodate as many as 16 CRT stations, each with a keyboard and visual display device.

The 3300 system is used for applications that do not have to be entered immediately into the CPU. The 3300 controller is programmable so that it can be modified for various applications, Wyatt said. Data entered into the 3300 terminals is batched on the controller tape unit and from there it is manually transferred to one of the eight 3420 IBM tape drives that are connected to the 370/145, he said.

Chilton's system consists of a control unit with 11 terminals, a high-speed printer, 45 in./sec tape drive and a 10M-byte disk drive.

The company keyed a total of more than 7 million records on that system during 1976. The system is used in the Chilton Book Co.; for subscription fulfillment; in handling more than 400,000 "bingo" response cards submitted by readers of Chilton's trade magazines; and for corporate personnel, payroll and other accounting applications, in addition to market research.

"We installed our first Inforex system, a Model 1301 intelligent terminal system, in 1972," Wyatt recalled. "Since then, we've continued to upgrade our installation up through our current 3300. In general, the advantages of the 3300 are that it is easy to program, offers powerful editing capabilities which reduce the need for verification and maintains response times even while it is running several jobs simultaneously," he said.

Chilton selected the 3300, in part, for its data validation capabilities, according to Wyatt; however, "many of our jobs require manipulation of a very large data base. We use CRT terminals on-line to the 370 for those jobs," he said.

For many companies, an on-line system would not be cost-effective, Wyatt noted. "The same was true at Chilton until we put several applications on-line, all of which can share the same major software package. For less complex jobs, or for special requirements such as the Presidential debates, the 3300 system offers an alternative to our on-line system," he said.

Wyatt said Chilton's market research operation, for example, surveyed the attitudes and opinions of more than 1.5 million people during 1976 for commercial, industrial and government clients. The results of more than 700,000 of those interviews entered Chilton's CPU via the 3300.

"The decision whether to to use the on-line terminals or the Inforex CRT equipment depends on the number of persons to be interviewed, the complexity of the questionnaire to be used and whether the survey method will be telephone or hard copy. Normally, the phone interviews are conducted using the on-line terminals, while we use the Inforex CRTs to key hard-copy questionnaires," Wyatt explained.

Chilton uses on-line terminals for subscription fulfillment in its magazine publishing division, but also offers subscription services to other publishers.

The 3300 is used more extensively in the Chilton Book Co., in an order entry application involving some 1,500 active titles as well as new and out-of-stock books.

Approximately 80,000 invoices are generated each year with data keyed from the 3300 CRTs. In addition to the entry of approximately 300 orders per day from wholesalers and retailers, the 3300 is used to update an 8,000-name customer master file and to update the division's master inventory record.

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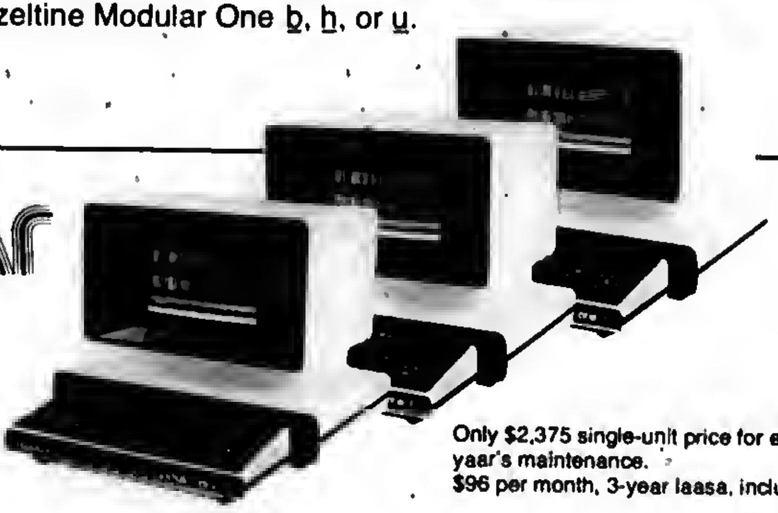

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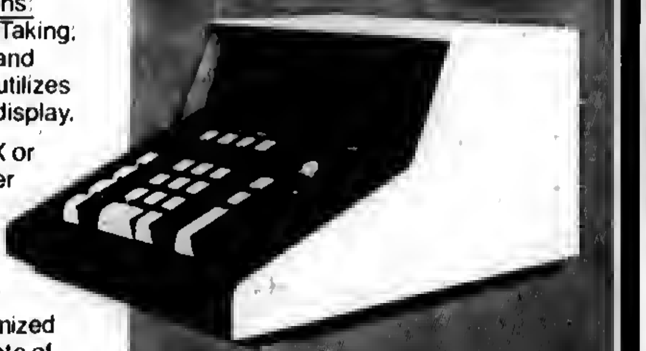

TR-10

The TR-10 is designed to serve a variety of customized data entry applications: Factory Data Collection; Inventory Taking; Security; POS; EFTS; etc. It is a stand alone, send/receive device, which utilizes a single or dual-line alphanumeric display.

Communications to computer, MUX or poller concentrator can be via either RS232 or TTY (20mA) disciplines. Terminal will operate in half or full duplex modes either buffered or unbuffered (Serial, ASCII, Asynch).

Led status indicators can be customized to depict operational modes and state of terminal and line. Keyboard incorporates eleven key numeric cluster with ten additional customer-selectable option keys. Interface provisions exist for: Parallel Interfaces; Badge Readers; Strip Printers; Cassettes, etc.

A versatile-low cost data entry terminal

TR-10's can be hooked together in contention or multi-drop loops via CTC's Micro-Based MUX/Concentrator

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Multiple CRT terminals are used to enter and retrieve customer information that is stored on a system maintained by National Sharedata Corp.

Harris CRT Terminals Access Integrated Customer DP Records

OKLAHOMA CITY, Okla. — Increased customer service, reduced waiting times and equipment flexibility are principal reasons why intelligent terminals are being used here in several departments at Liberty National Bank and Trust Co., the largest bank in the state with assets of more than $1 billion.

Using a computerized central information file system on a dual host computer, Liberty National Bank has installed 40 Harris 8170 keyboard/display terminals and four 88 char./sec printers in its commercial loan, credit authorization, stop payment and central information departments.

Nine Account Areas

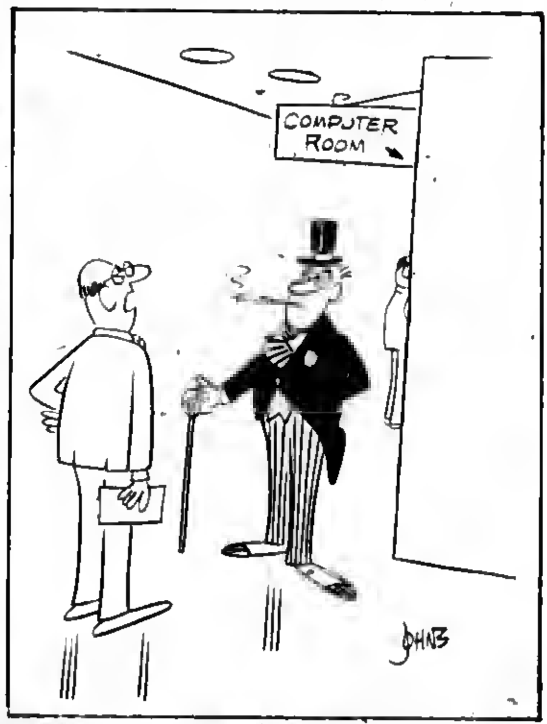
Liberty Bank personnel can obtain information on any of its customers in nine areas of activity and display that information simultaneously on the terminal screen. Activity areas include checking, savings, installment loan, mortgage loan, commercial loan, credit card, certificate of deposit and safety deposit box. Personnel also can determine if a customer is a Liberty Bank shareholder.

"This automated system enables us to keep updated files on a bank's thousands of customers and to relate all the customers to various account numbers. Many customers have several accounts and many of the accounts involve different individuals," Jack Hoherecht, vice-president and cashier at Liberty Bank, said.

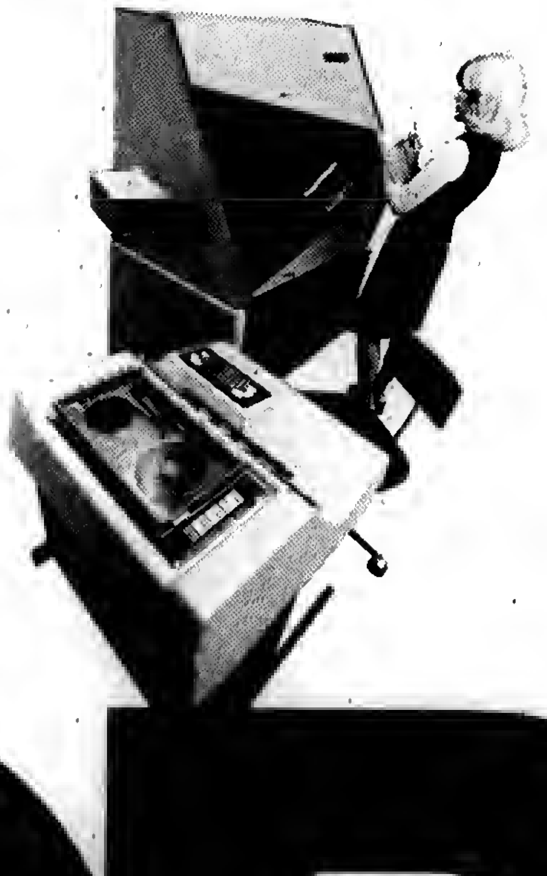
The Harris terminals, installed in February 1976, are on-line to the Oklahoma City DP center of National Sharedata Corp., a nationwide facilities management company that specializes in providing bank-related DP services. Terminals at Liberty National Bank communicate at 4,800 bit/sec over telephone lines to dual IBM 370/145 computer systems and use National Sharedata's on-line software package known as Solis.

"Because of the programmability of the Harris terminals, we can upgrade to other mainframe compatibility with minor hardware and software modifications to the seven controllers for the 8170 terminals when the time comes," Lelan Nelson, vice-

(Continued on Page S/17)



'Dawson, Is There Any Truth in the Rumor You Used Company Computers to Work Out a Vegas System?'



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CRTs Access Bank's DP Records

(Continued from Page S/16)

president of systems at Liberty Bank, said.

Nelson explained that the bank is emulating IBM 2260 asynchronous terminals, but will upgrade to emulate 3270 binary synchronous terminals within the near future to provide greater capability to the bank.

Account Inquiries

Using 40 terminals, bank employees perform about 4,000 transactions per day, most of them inquiries into the centralized customer account file to respond to questions from departments within the bank, as well as from customers and local merchants.

"The majority of the inquiries involve checking and savings accounts," Ruby Kirkbride, central files officer, said. "A typical savings account record will show the current balance, average balance, projected interest, last year's interest paid and withdrawals for the current quarter. The installment loan information includes the amount of the loan, payment date, current balance, late notices and payoff amount," she said. The balance due on an individual's credit card is also available.

"By having all of this up-to-date information instantly available at the touch of a terminal keyboard, we are able to provide immediate response to all inquiries," Kirkbride said.

Two Harris terminals and a printer are used in the bank's commercial loan department to handle about 1,000 transactions per month involving loans of $25,000 or more, according to William K. Martin, assistant vice-president in that department.

Commercial loans record department uses Harris 8170 interactive terminals to retrieve information.

"Any of our loan records is easily available by typing the customer's account on the terminal keyboard. Almost immediately, we can see the credit status, date the account was opened, permanent and temporary historical data and status of three categories of current liabilities — secured, unsecured and indirect," Martin explained.

"Additional information on indirect liability, for instance, can be displayed and would include account numbers, note numbers and percentage of liability for that individual," Martin said. "These can be expanded even further to determine individual accounts, who guarantees the notes and individual customer names, if required.

"Other pertinent data that can be displayed on the terminals includes due dates for customer financial statements, whether a loan is on hold, if the line of credit exceeds the approved amount and if it has expired," he said.

The terminals also are used to add new customers to the bank's central file and to update existing customer files, Martin said. "We are constantly updating our files with new notes, note renewals and note extensions," he said.

Five Harris terminals and one printer also are used in the bank's BankAmericard department to provide instant credit authorization to local and area merchants who call the bank. When calls are received, the user's account number is typed into the computer through the terminal keyboard. Credit information is immediately displayed on the video screen of the terminal and then given to he calling merchant.

To service BankAmericard holders who are visiting from other parts of the country or have had their BankAmericard cards issued by their local bank, Liberty Bank uses a Harris 810 intelligent terminal to access the BankAmericard national network and thus provide local credit authorization as if the cardholder were a local or area resident.

Harris terminals are also used by the bank's personnel to retrieve information on bad, lost or stolen checks and to issue "stop payment" notices for customers.

The dual IBM mainframe computers are equipped with two Periphonic front-end communications processors that link terminals to the mainframe. Other supporting equipment includes 16 large-capacity disk drives, 24 magnetic tape drives, five line printers, and five check reader-sorters.

Harris terminals installed in the stop-payment department of Liberty National Bank & Trust of Oklahoma City provide access to customer accounts.

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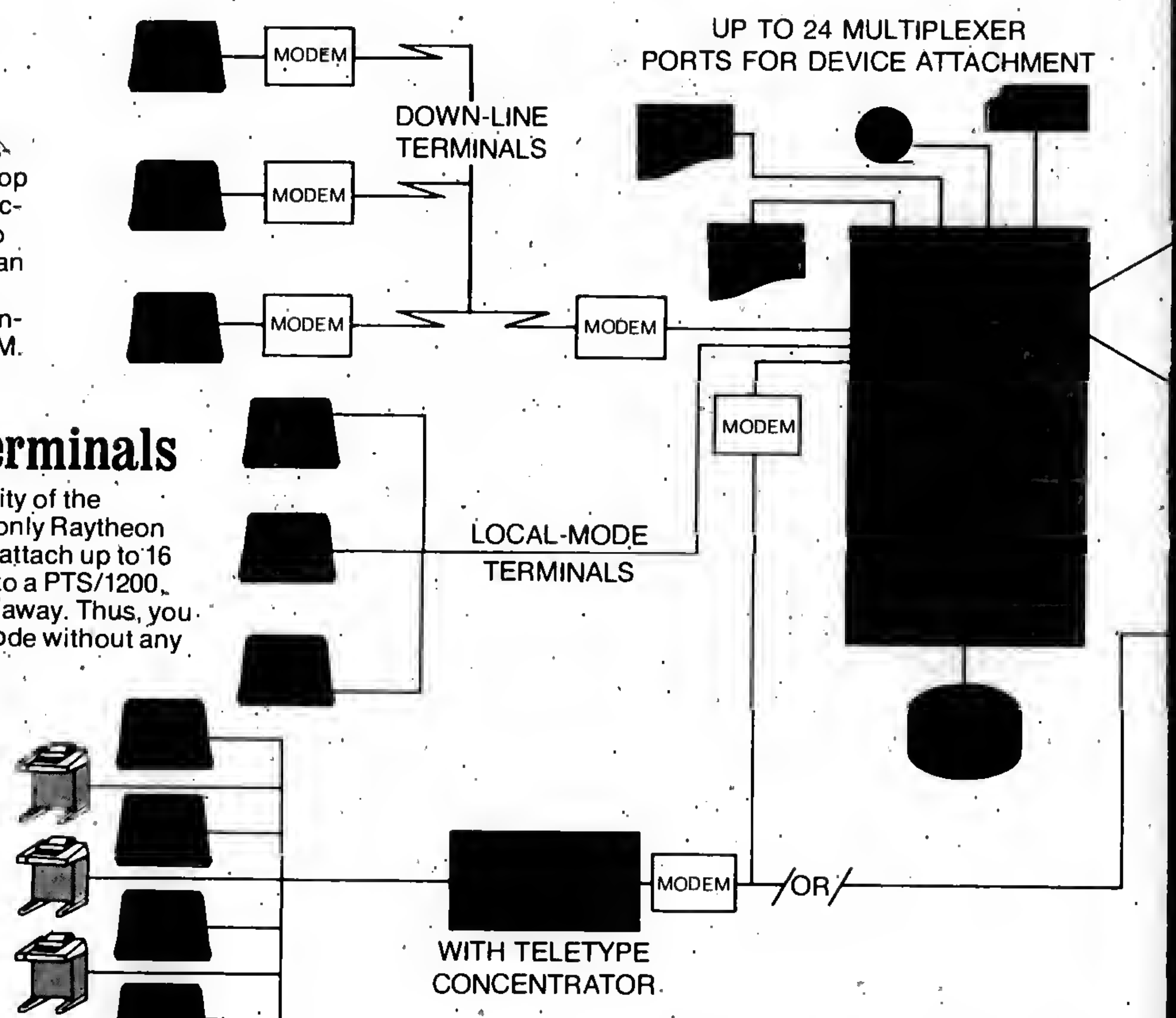
In the past three months, Raytheon has been busily adding more and more capabilities to its PTS-100 intelligent terminal and PTS/1200 distributed processing systems. The reason: to give you more and more reasons to keep buying Raytheon.

Here are ten good ones. Watch this space in coming months for at least five more.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Raytheon has always been known for prompt delivery. We know that when you need it, you want it. There are five new capabilities described in this ad. All five will be in production by June 30th. This year—1977.

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In a distributed processing system—anyone's distributed processing system—you need disk storage capacity adequate to handle the workloads. Raytheon has just announced a new 320-megabyte disk capacity for its PTS/1200 system. That's 10 times larger than the 3790's.

good reasons to choose Raytheon.

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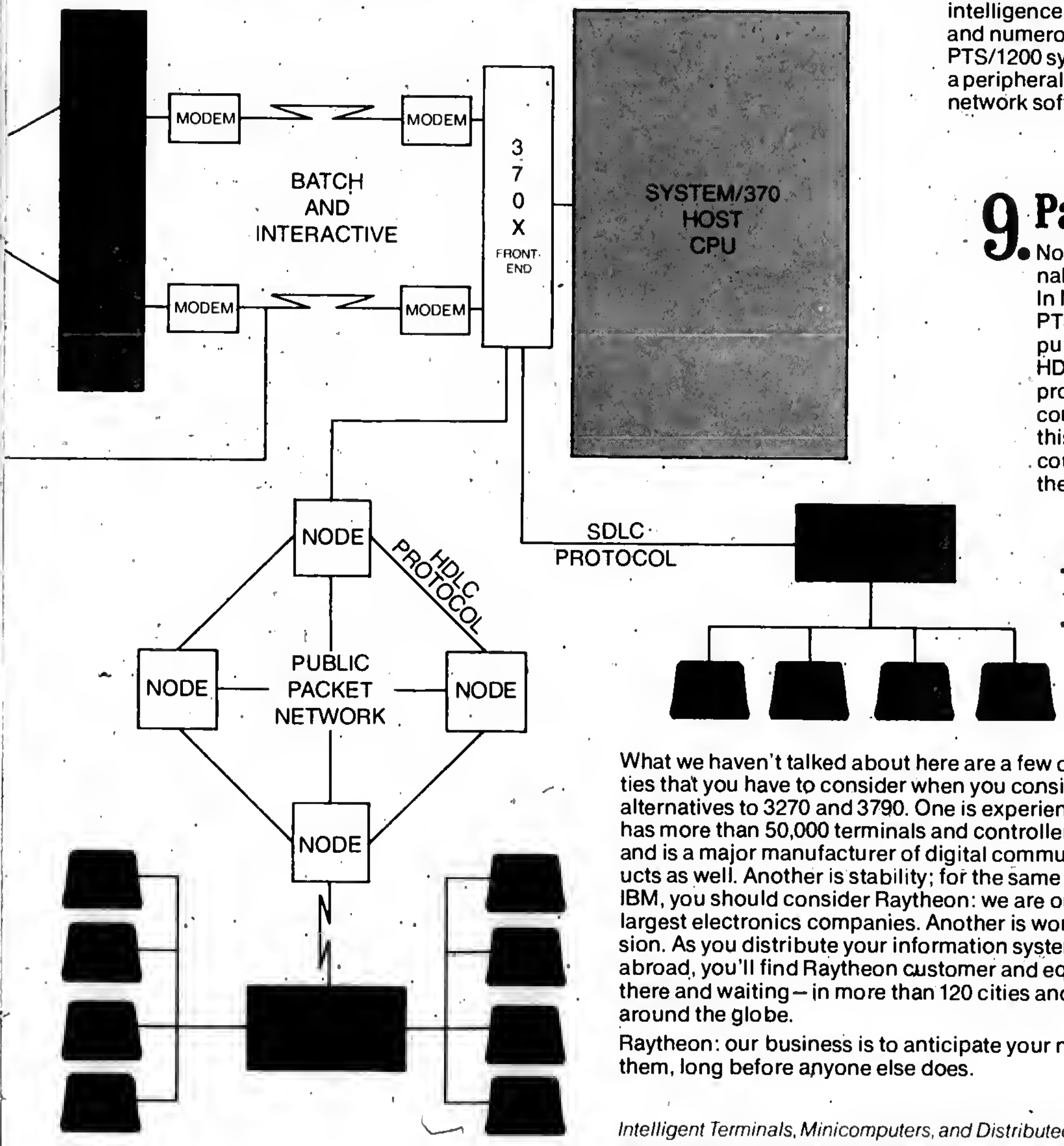
Two months ago, Raytheon demonstrated what no one else has—true 3270 concurrency. Our 3270 emulator lets you communicate interactively on a transaction basis with your host CPU. Our 2780/3780/HASP emulator package lets you—at the same time—communicate in batch mode. What counts about that is immediacy: you can do both right now, without any additional applications or front-end software development. And especially, no VTAM or NCP hassles.



8. Total Programming Freedom

This long-standing feature of Raytheon systems needs repeating. Because of the combination of high-level language, very large intelligence capacity, powerful macro routines, and numerous emulators, PTS-100 and PTS/1200 systems treat your host CPU like a peripheral. The result: data networks without network software development.

9. Packet Network Connection

Not with TTYs or ASCII-based terminals, but with 3270-type CRT devices. In March, Raytheon demonstrated its PTS-100 terminals operating on a U.S. public packet network under both HDLC line protocol and X.25 device protocol. We are the only major U.S. company operating such terminals on this international standard in other countries. Now we have it for you in the U.S.

10. SDLC Operation

And yes, every system in the PTS-100 family operates under SDLC protocol if you want it to. Or binary synchronous. Or HDLC. Or 1006. Or 2848/2260. Or Uniscope. Among many others.

What we haven't talked about here are a few other capabilities that you have to consider when you consider Raytheon alternatives to 3270 and 3790. One is experience—Raytheon has more than 50,000 terminals and controllers in use today, and is a major manufacturer of digital communications products as well. Another is stability; for the same reason you like IBM, you should consider Raytheon: we are one of the world's largest electronics companies. Another is worldwide dimension. As you distribute your information systems here and abroad, you'll find Raytheon customer and equipment service there and waiting—in more than 120 cities and 35 countries around the globe.

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Ohio Leads with Law Enforcement Terminal System

COLUMBUS, Ohio — Ohio's acronym for its terminal-based law enforcement system — (Law Enforcement Automated Data System (Leads) — is aptly chosen since the state has been in the forefront of developing systems for public safety over a long period.

Recently, enhancements to Leads became operational making it what is believed to be the largest single site, terminal-based, law enforcement computer installation in the U.S. and possibly the world.

Nearly 800 terminals at remote sites throughout Ohio are now linked via data communications lines to a large-scale Sperry Univac 1100/42 multiprocessor computer system installed in the 41-story state office building here.

Serving the computers is one of the largest disk storage data bases to be found anywhere with a total of 10.24 billion characters of information stored on 80 disk drives.

Looking over map of 400 terminals in Ohio's Leads police network are (left to right) Staff Lieutenant Eugene R. Howell and Major Ted G. Gentry of the State Highway Patrol.

In contrast to many states, with separate computers for major departments, the Bureau of Motor Vehicles (BMV) and the State Highway Patrol, both forming part of the Ohio Department of Highway Safety, share the same multiprocessor computer complex and data base.

The State Highway Patrol is responsible for 400 terminals tied in to the system. Sixty of these terminals, Sperry Univac Uniscope 100 visual displays, are installed in 57 highway patrol posts. Another 60 Uniscope 100 units are installed in sheriff's offices and higher traffic volume police departments in the state.

The Uniscope devices are equipped with attached printers allowing hard-copy versions to be produced of any messages appearing on the screen. Another 280 low-speed NCR Model 260 buffered, nonimpact, printer-type terminals are installed in lower volume police departments.

In addition, 125 terminals forming part of computer systems operated by the police forces of Hamilton County (Cincinnati), Cleveland and Toledo also funnel into the Columbus DP center. In the near future, four major cities in Ohio — Columbus, Dayton, Akron and Youngstown — are expected to interface their local computers and have direct links to the Columbus computer center.

For its part, BMV utilizes 25 Uniscope 100 displays at headquarters for administrative purposes and program development and 230 Incoterm display terminals located primarily in remote sites for driver license renewal.

The 1100/42 multiprocessor system consists of two command/-arithmetic units and two input/-ouput units with a combined storage capacity of 458,000 words. In the event one processor should suffer a technical malfunction and "go down" the other processor can automatically take over.

The 1100/42 system is front ended by two communications symbiont processors (C/SP) to handle the high volume of communications flowing into the system. One C/SP supports the real-time network and the other supports demand and on-site peripherals. Each C/SP is capable of handling 96 communication lines.

The 80 disk drives consist of 72 Univac 8440 drives and eight Univac 8433 units. Each drive has an average access time of 30 msec.

Also part of the system are eight Uniservo 20 magnetic tape units, two 0768 printers with a speed of 1,000 lin/min, two 0716 card readers and one 0774 card punch, all from Univac.

Stored in the BMV portion of the data base is pertinent information on 7.9 million drivers' licenses and more than 8 million vehicle registrations in the state. Included in the drivers' license file are records of "points" accumulated by drivers involved in traffic violations.

The State Highway Patrol stores information in the data base on wants and warrants, stolen cars, stolen or lost license plates and vehicles used in felonies.

The system supports a vast complex of communication lines. These consist of four high-speed 4,800 bit/sec data lines going to remote CPUs on the system in Cincinnati, Cleveland, Toledo and BMV; 20 high-speed 2,400 bit/sec lines linking other CPUs and the Uniscope 100 display terminals to Columbus; 28 medium-speed 1,200 bit/sec lines connecting the Incoterm terminals to the system; and 20 low-speed 150 bit/sec lines connecting local police departments using the NCR terminals.

Special communications circuits also connect the system with the

(Continued on Page S/21)

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State Public Safety Agencies Utilize 800 Terminals

(Continued from Page S/20)

FBI's National Crime Information Center (NCIC) in Washington, D.C., and the National Law Enforcement Teletype System (Nlets). Nlets serves more than 4,000 police departments in a nationwide network primarily designed for handling administrative messages.

The Ohio system has a communications network monitor station to provide centralized control of all communications input and output lines.

One of the pioneer states in establishing a computer-based law enforcement system, Ohio started its Leads system using an IBM 360/40 in 1968.

The heavy increase in the volume of traffic on the system necessitated an upgrading to computers operating at higher speeds and with greater backup capacity in the event of equipment failure. As a result, the former State Department of Finance, now the Department of Administrative Services, contracted for a Univac 1106 multiprocessor system in 1973 and then upgraded to the 1100/42 system in 1976.

The 1100/42 system uses Data Management System/1100 (DMS/1100) in conjunction with the Transaction Interface Package (TIP) to facilitate on-line transaction processing including data base accessing.

TIP is an extension of the 1100/-42 operating system which provides an interface between a user-written transaction program and the communication complex facilitating transmission to and from remote terminals.

DMS/1100, a data management system, permits a transaction program written in Cobol to access records within the data base in real-time, interactive and remote job entry modes.

Law Enforcement Aid

Col. Adam. G. Reiss, superintendent of the Ohio State Highway Patrol, said Leads has been a boon to law enforcement in the state.

"We've made great strides in going from a teletypewriter system to a computer-communications network; now we can have the information in the files available in a matter of seconds rather than days or even weeks as in the past," he said.

"Presently our troopers are averaging 200,000 checks a month through the system to keep on top of the stolen car problem," he added.

"Beyond the highway patrol's own use," he continued, "we've found that city, country and township police forces throughout Ohio are enthusiastic about the system. In order for these organizations to obtain the maximum benefit from the system, we operate an ongoing training program using our troopers. As part of this program, a patrol representative personally contacts each local police department at least once a month. We believe these contacts pay dividends in the long run as correct operation is essential for the maximum effectiveness of the system."

Ohio State Highway Patrol operator uses Univac 120 Uniscope CRT to access Leads network.

Major Ted. G. Gentry, in charge of the Bureau of Technical Services of the Highway Patrol, noted that currently the response time for receiving data on a terminal from the computer averages about 3 to 5 seconds vs. 30 seconds before Leads began using higher performance computers.

"Basically the system has improved considerably," Gentry said. "The shorter computer response time was a 'must' for us because of the constantly higher volume of transactions we're handling.

"When we started the Leads upgrade we were averaging about 70,000 transactions daily. By the time we cut over to the new computers in March 1975, we were up to 122,000 transactions daily. Presently we are running at about 175,000 transactions daily," he said.

"We're continually adding more local police departments to the system which in itself adds still further to the volume of messages," he noted.

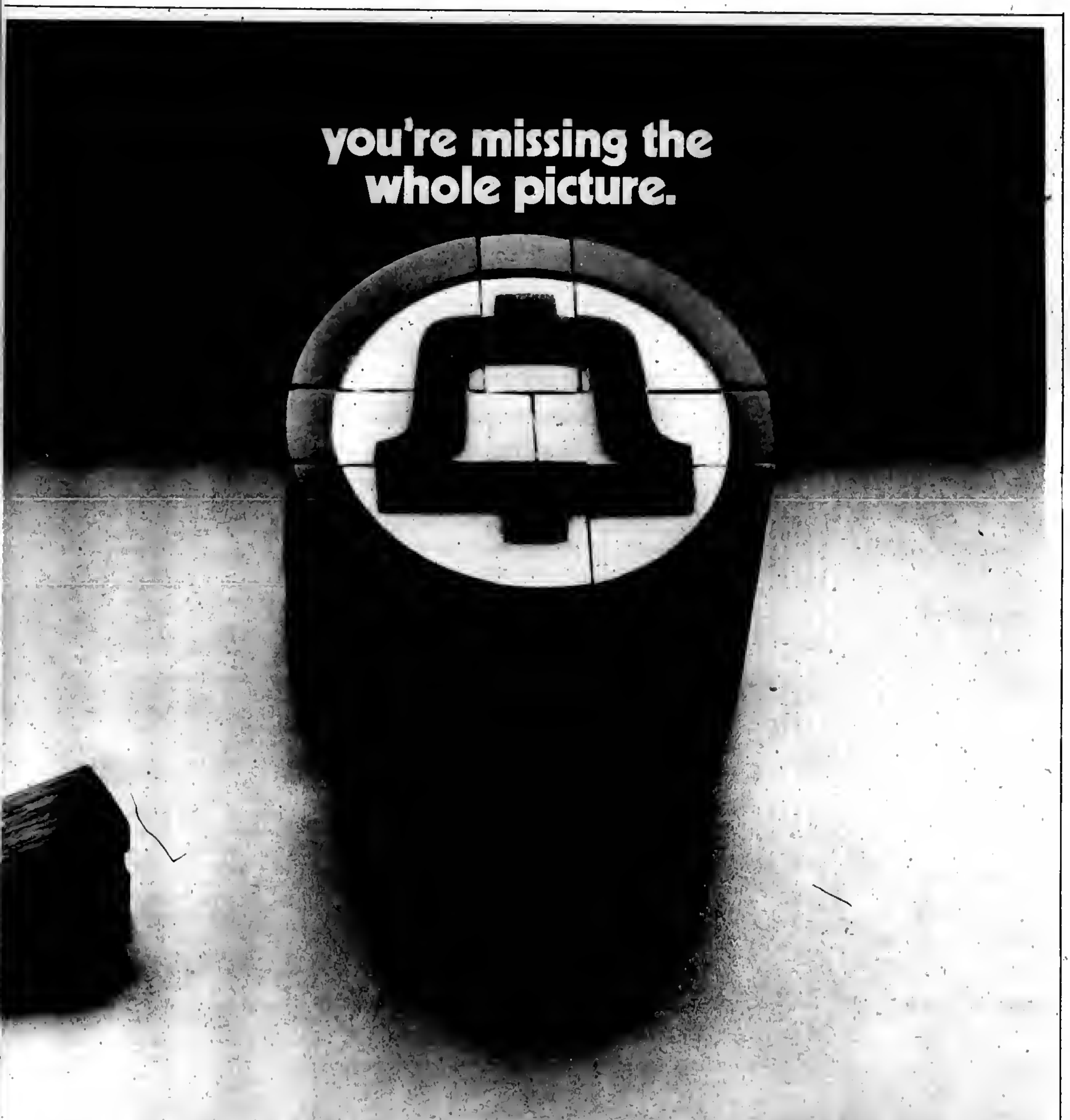
Vehicles on File

The motor vehicle registration file contains the name and address of the vehicle owner, vehicle type, model, serial number and current registration information. Vehicles can be traced through inquiry by either registration number or identification number.

The drivers' license file contains information recorded on the individual's license: license number, driving restrictions, name, date of birth, sex, weight, height and color of hair and eyes.

A real-time system for the re-

(Continued on Page S/22)



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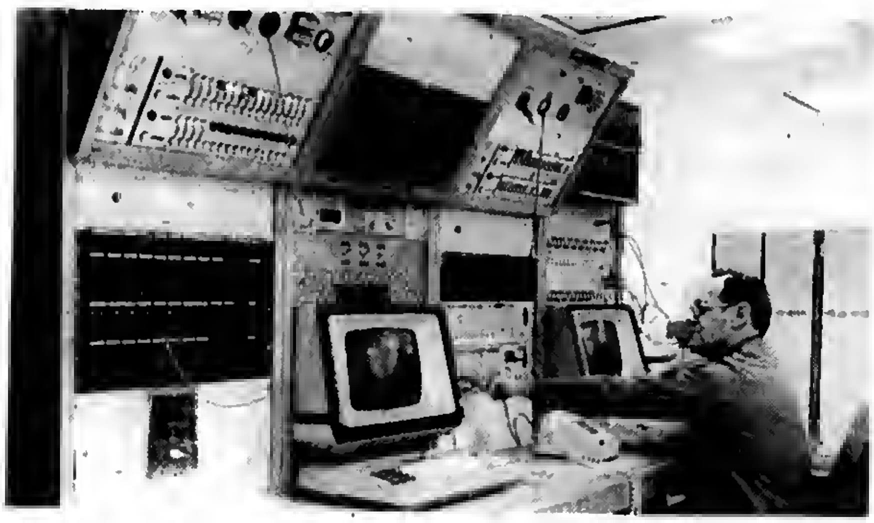

Sergeant Robert L. Worman of the Ohio Highway Patrol operates control monitor which keeps track of data links into Univac 11--/422 multiprocessor system.

Highway Patrol, Motor Vehicle Bureau Rely on CRT-Based Enforcement Net

(Continued from Page S/21)

newal of drivers' licenses in Ohio became operational early in 1976. The new system considerably speeds the updating of information in the computer file.

Applicants renewing their licenses (valid for four years in Ohio) go as usual to the local office of the deputy registrar, the issuing authority in Ohio. Each deputy registrar office now has an Incoterm visual display, an "intelligent" terminal with 4,000 bytes of memory storage, linked to the 1100/42 system in Columbus.

Using the terminal, personnel can make a real-time check with the computer to ascertain that the person applying for license renewal is indeed qualified to drive and isn't under a suspension or revocation.

Previously, according to Donald Cort, assistant deputy director of the division of Computer Services, the license would probably have been renewed even though the person was ineligible because of the time lag in getting information into the centralized system.

Under the old system, Cort said, the information was entered into the computer under a batch program that could take a few days to process and it might be 30- to 60 days before the information from the centralized system could effect a cancellation of the previously issued license.

According to Jerry Hammett, deputy director of the Division of Computer Services, Leads has become a much finer system with substantial enhancements since it began operating under the new multiprocessor system.

More Reliable

Hammett said the system is faster, quieter and more reliable now. Most of the special software tailored for the state's needs, he explained, was developed by a joint Ohio State-Sperry Univac team.

A major advantage of installing a multiprocessor system, Hammett related, was that the state could dedicate a major portion of it to law enforcement without having to rely on an administrative system as backup because of the redundancy built into the 1100/42 system.

Hammett said plans are currently being formulated for additional use of the Columbus computer complex in law enforcement and criminal justice activities.

"We're looking into the possibility of using these computers for all law enforcement and criminal justice activities including the Bureau of Criminal Investigation, the Department of Corrections, Youth Commission and the State Supreme Court.

Exceeds Expectations

Summing up the results achieved so far from the system, William G. Christie, data systems administrator for the Department of Highway Safety, commented that the system "is doing more than anybody thought it would.

"It's been our goal for a long time," Christie asserted, "to put all of our records in a common data base and we feel that we've made a good deal of progress down that road."

Looking to the future, Christie plans on adding a real-time motor vehicle registration file to the computer's workload. This would be a system using intelligent terminals for on-line registrations. An obvious benefit would be the timeliness of data being updated. This data would then be the heart of a fiscal accounting, inventory and revenue distribution system for Ohio's 1,157 local taxing districts.

"Ohio has a record," concluded Robert M. Chiaramonte, director of the Ohio Department of Highway Safety, "of being one of the most cost-effective state governments and we're doing everything we can to maintain that reputation by running all of the operations under Highway Safety as efficiently and economically as we can. We believe that computers can play a major role in many of these operations."

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'Do-It-Yourself' Units

Stanford University Sends Homemade Terminals Home

STANFORD, Calif, — Stanford University is getting into the swing of the new home computer boom by providing "build-it-yourself" computer terminals to 50 DP employees and 50 students to use at home.

The terminals give the students and DP personnel access to the school's computer system from the convenience of their homes, offices or classrooms. Moreover, the students and employees assembled the video display terminals themselves from the hobby kits.

The university recently purchased the do-it-yourself ADM-3 Dumb Terminal kits produced by the Data Products Group of the Lear Siegler, Inc. Electronic Instrumentation Division as part of two separate projects to provide additional low-cost I/O devices for the university's computer communications network.

One obvious benefit of the homemade terminals is that they save both groups from running down to the computer center to get their computing work run any time they have jobs to do.

Employees of Stanford's Center for Information Processing (Scip) and students in a special program designated Low Overhead Timesharing Services (Lots) assembled the terminals using only basic tools such as soldering irons, needle-nose pliers, wire cutters and screwdrivers.

The Dumb Terminals — CRTs with keyboards that let users enter data for processing — are so-called because they function simply like "quiet" teletypewriters.

For use at home, Stanford employees needed a compact, lightweight terminal. The Dumb Terminal fit the bill at only 25 pounds. The terminal is 12.5 in. high by 15.5 in. wide by 19 in. deep yet provides a 12-in. screen, measured diagonally. Power consumption for the terminal is 70W.

Time Savings

An economical answer to the university's terminal needs, the kits also represent a savings in waiting and traveling time by allowing employees to work at home. Some 50 participating Scip employees now have kits permanently assigned to their homes, enabling them to access Stanford's interactive systems any hour of the day or night, without ever stepping outside their front door.

"Having a terminal at home has given me the freedom to work my own hours, which are often late at night and weekends," Richard Guertin, one of the participating employees, said.

"I not only save the gas and time previously spent in extra commuting during predeadline periods, but get my work done faster by avoiding the university's usual interruptions. By working nonstandard hours, I can also avoid the daily traffic jam of programmers awaiting access to the computer," Guertin said.

Stanford University programmers can also utilize computers at other universities for special projects. Prior to home terminal arrangements, programmers needing to communicate with the computer center at the University of Michigan, for instance, were forced to arrive on campus hours earlier than usual to compensate for the time zone difference.

User convenience is only part of the home terminals' benefits.

Quick Repairs

Program breakdowns occurring after regular working hours can now be corrected in minutes, because the programmer doesn't have to drive anywhere. Immediate input to computer programs is particularly beneficial to employees working with the Stanford University Hospital, where quick repairs can often be crucial to the hospital's operation.

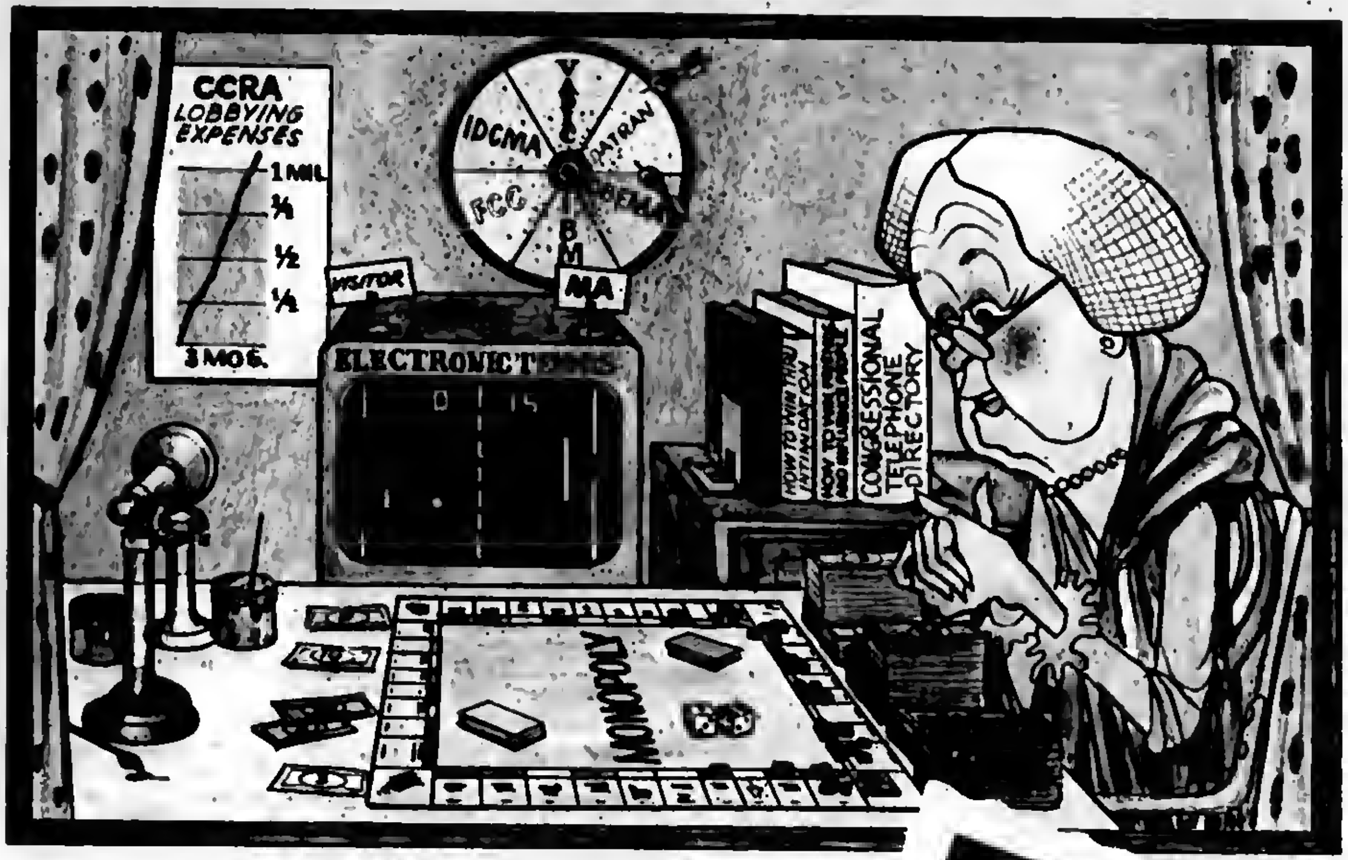
The terminals are connected to the computer center's IBM 370/168 which is also used by Stanford students and researchers.

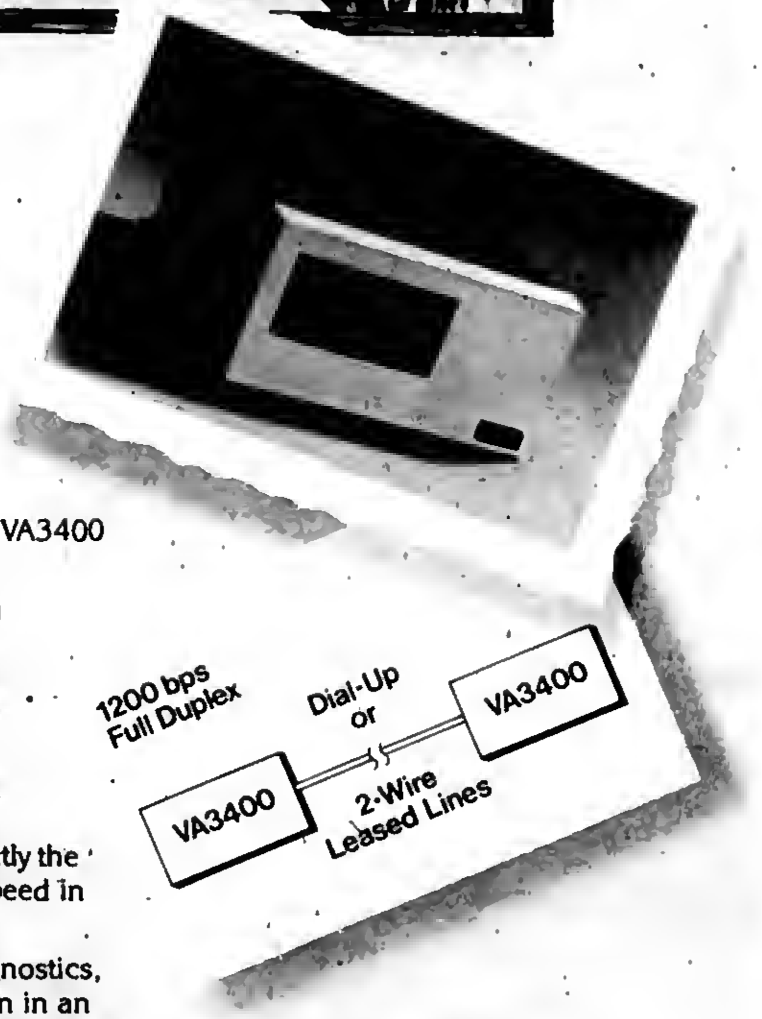
Lots, the second porchase program, was established by Stanford to provide students with additional facilities for 24-hour cost-effective interactive computing capabilities, using a Digital Equipment Corp. System 20/40.

"Lots was able to supply students with 50% more terminals by choosing the lower priced Dumb Terminal kits over fully assembled models with the same features. The kits were all assembled by students, who are also planning to take on maintenance functions for the 50 terminals," Ralph Gorin, manager of Lots, said.

Lots is open all the time and imposes no time or subject limits on student usage. Previously, students had accounts with dollar equivalents; when the money was gone so were rights to the computer. Students were also restricted to specific course work.

Plans are now being made to install a few terminals in the student dorms so they can also have the opportunity to "work at home."





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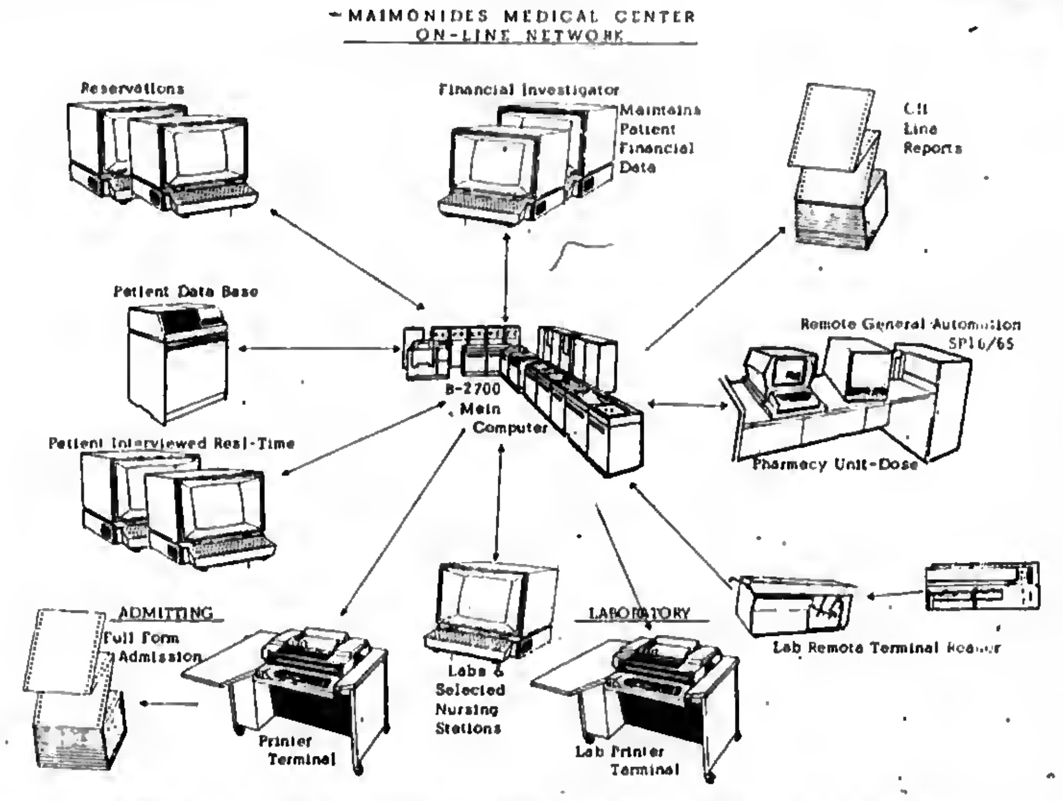
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System diagram of Maimonides on-line financial and medical terminal network.

Modular Data System Helps Hospital Treat Its Ills . . .

BROOKLYN, N.Y. — When administrators at Maimonides Medical Center here began looking for a way to upgrade the center's computer system to reduce the workload, time and costs associated with patient admissions and reservations, the first place they looked was to their present computer system. Specifically, how could the DP staff improve the efficiency of the Burroughs B-2700, the heart of the system.

The need for centralization of all records was immediately evident as the first step toward achieving these goals. Ideally, the final system configuration would permit terminal access to the entire realm of patient information: medical, sociological and financial. While the sociological and medical portions of a patient's record initially would be accessed only in certain locations within the center, ultimately medical records as well would be available from terminals at nurses' stations on patient care floors.

Data Network

The present on-line network includes a General Automation SP 16/65 with appropriately connected terminals which is constantly on-line to the Burroughs main computer to handle and control the center's unit-dose system. The laboratory is on-line via modems utilizing a variety of terminal devices also permitting access to patient results at selected points in the medical center. In developing the data network, it was understood that certain existing systems would be blended and others integrated, based upon upgrade potential and the systems life expectancy, plus cost justification.

At the time, the center's primary data collection of patient admissions, transfer, discharge and expirations consisted of a direct connect line from the main computer connected to four vintage video display terminals which were considered underfeatured and inefficient. They had served a valuable purpose and for that period of time in which they were in use, they helped to do a fine job. But as evolution took place and other systems were implemented, such as laboratories, pharmacy unit-dose and enhanced financial reporting, the system and the people just could not keep pace with demands for a faster, more reliable media.

In order to speed up the information exchange and satisfy projected requirements, it was determined that two objectives be accomplished: develop a modular system with a total patient data base structure in mind and keep it human-engineered, which would lend itself to a low learning curve: and select a suitable video display terminal, which would lend itself to a conversation real-time mode, hopefully with Burroughs protocol for CPU compatibilty, competitively priced and full featured.

The first objective was a question of designing a new system, utilizing the power contained within the Burroughs MCP STO-Q and developing program modules which would effectively pass data through a designated STO-Q. The second objective was engaging in the selection of terminals that would do the job effectively, with the least amount of R&D, and maintain reliability. The terminals would be installed at appropriate stations throughout the hospital.

"The problem," according to John Harbison, director of systems & computer operations, "was that we had to find a microprogrammable video display terminal that would not only handle the information exchange between operator/computer/department, but would also be compatible with the Burroughs processor.

Selecting a Terminal

Four different manufacturers' video display terminals were evaluated for the system. "We eventually decided on the Delta Data Systems Corp. 4050B terminals, mainly because they could most easily fit into the center's existing system, in that not only protocol emulation for the Burroughs processor but also Burroughs terminal emulation is built in," Harbison said.

The Delta terminals at Maimonides are equipped with 2K characters of refresh memory and display 80 columns by 25 lines of upper- and lower-case characters. The display and editing features of the terminal were also considered, Harbision added, because of the many different forms the center's people use regularly.

In meeting the goals set forth in the first objective requirement, Maimonides developed a modular system and gave it the name Financial And Medical On-line Unified System (Famous), which officially went on-line at Maimonides on March 1, 1977. The delta video terminals and the Burroughs TC4000 printer form a critical part

(Continued on Page S/25)

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ENVIRON 1	3.1	3.1	3.2	3.1	2.3	2.5	2.5
CICS	3.1	2.8	2.4	2.8	2.8	2.9	2.8
INTERCOM	2.7	2.8	2.2	2.5	2.1	2.1	2.5
IMS/DC	2.8	2.5	2.4	2.5	3.0	2.9	2.8

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—Harvey Kennedy, Vice President and Director of Management Systems, Southern Baptist Annuity Board (Dallas).

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—Ben Driver, Data Base/Data Communications Software Manager, Brockman On-Line Systems (Houston).

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. . . By Centralizing Records, And Terminal Access to Files

(Continued from Page S/24)

of this first module of the center's network.

The first modules of Famous to be implemented incorporate the admitting department and the financial investigator's office, comprehending on-line reservations, real-time admissions, discharges, transfers and on-line financial follow-up. Since the center maintains a very high occupancy, the time in processing patients is especially critical and must be accomplished swiftly and accurately.

Of the display terminals incorporated in the system, six are currently used in conjunction with one on-line printer with admitting procedures. Presently, there are three display terminals in the financial investigator's office for financial follow-up procedures and reservations, plus one terminal which serves as a backup.

Reservations are handled in the financial investigator's office for elective admissions, via the video terminals in that location. Standard admitting information, including all financial data, diagnosis/operation and tentative requested date of admission, are entered and available for recall at any time.

The system automatically assigns a reservation number which assists in maintaining orderly control. A special report is produced off-line each night providing a reservation register which also shows those patients to be called in for the following day.

The terminals in the financial investigator's office are also utilized to maintain up-to-date financial data on all patients including reservations and thus are always accessible for immediate terminal review.

The patient admissions interview is also handled via video display in a conversational mode, with information being collected and/or updated in real-time via the Burroughs mainframe. Naturally, it is accessible by display terminals in any of the respective areas by authorized users. Upon completion of the admissions interview via CRT, a full-form record of admission is printed via a Burroughs TC4000 terminal, also on-line to the mainframe.

Previously, a total of eight forms had to be filled out for an incoming patient by the admitting interviewer. A messenger then prepared an I.D. plate and bracelet for the patient, as well as additional forms and charts while the patient waited in a reception area. Admissions information was entered onto a display terminal on a time-permitted basis, usually more than an hour after the patient had been admitted.

Third-party notification forms were typed later in the financial department and there was no direct access from this department to admissions information which must be used to determine patient pay status.

Now all forms have been computerized and are either included with the full-form admission record set or are produced off-line at midnight to effectively utilize the systems capability.

Whereas patient information had previously been isolated in separate filing areas, it is now hrough together in one central patient file. The present patient profile, which includes information about reservations and admissions, insurance and other hospitalization coverage, has begun helping Maimonides personnel improve cash flow projections and monitor insurance payments more efficiently while cutting down greatly on routine paperwork, according to Donald C. Rizer, the center's director of financial management.

System Expandability

The capability to handle an almost unlimited number of real-time program modules is limited only to hardware limitations, since the software design ideally lends itself to a modular building block concept. The Famous system has proven itself since the first day of implementation wiht its simple adaptability by users, Rizer said.

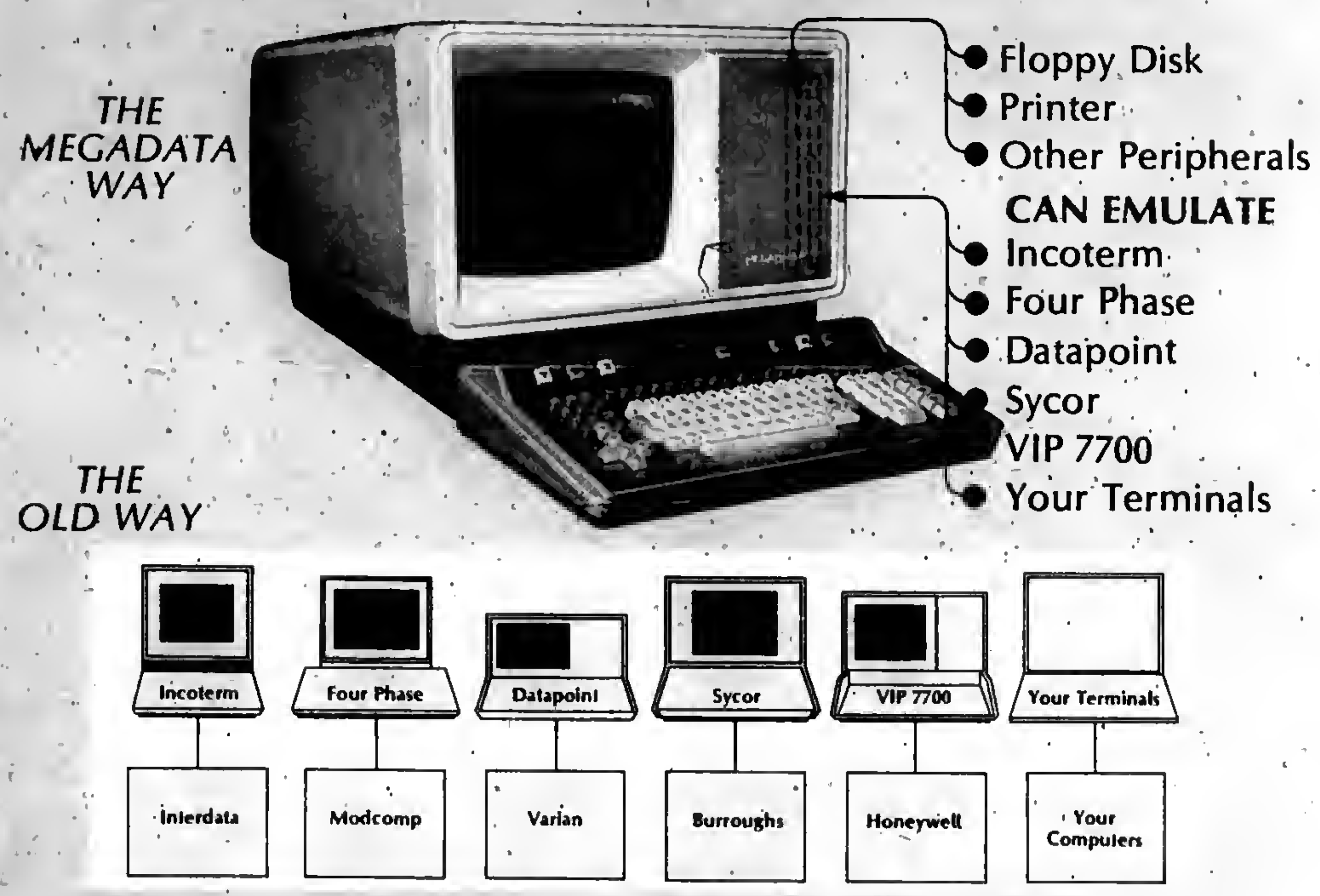
Since the center has had the pharmacy unit-dose and laboratory on-line, it was also necessary to integrate the information essential for an eventual total patient data base.

The next stage of expansion will take place in modules to handle the cashiers' functions, including special duty nursing and on-line demand bills; this development is currently under way and will be implemented by September 1. After this, development will continue through the medical areas such as radiology and a more comprehensive inclusion of laboratories and pharmacy.

Certain mainframe hardware upgrades are planned to provide the additional computer power necessary, including a front-end data concentrator with a 50kbit/sec channel to the mainframe; this is planned for the early part of 1978.

Eva Weill, admitting clerk, operates Delta Data Systems CRT to demonstrate on-line system at Maimonides Hospital.

MEGADATA's Model 700/UETS
Universal Emulating Terminal System



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For Minneapolis Outfit

Retail Store Scanners Analyze Sales, Cash Flow

MINNEAPOLIS — "Standing still is going hackwards."

That was Sherm Quisberg's comment when asked why he had installed front-end terminals in one of his four Super Valu Stores located here in St. Paul.

"I started getting an exposure to the concept of front-end terminal systems almost five years ago at the Supermarket Institute, but at that time that is all it was — a concept. Yet the potential seemed enormous."

Quisberg, as owner and president of four stores, had his hands full coping with the realities of running his business day-by-day, being competitive and keeping a stable bottom line. There wasn't the time necessary to conduct a meaningful feasibility study of front-end terminal equipment, evaluate their individual merits or determine which (if any) was right for his stores.

He was quick to point out that he relies on the many services provided by Super Valu and it seemed a logical place to elicit research support.

Super Valu had, more than two years previously, initiated an in-depth study of front-end terminal systems under the direction of Paul J. van Helden, senior vice-president of corporate planning and information systems. The purpose of the study was to allow the management of over 1,600 Super Valu Stores to make more informed judgments when considering upgrading to more sophisticated checkout systems.

"I didn't want to revolutionize my checkout systems overnight, but I did want to start with my present system's capability as a low-end starting base," he said.

"I was fortunate," Quisberg added, "to have a man like Al Jensen as store manager of our inner city Minnehaha Mall store, the site of our first installation. He had both an electronics and training background in addition to his retailing management qualifications, having been with Honeywell's Commercial Division as assistant training manager. With the experience we've both gained, my other managers will be ready for electronic front-end systems when their turns come."

Although Super Valu had not yet completed its formal study, it was "leaning" toward the Sperry Univac Accuscan on the basis of numerous critical criteria including system capabilities, upgradability, flexibility, price and a committment to continue to serve the retail community.

Quisberg indicated he had virtually decided to acquire another manufacturer's equipment at that point, but decided to make time to evaluate Accuscan.

It was in August 1976 that Quisberg installed an Accuscan system. At a later date, Super Valu gave its formal endorsement to Accuscan.

Advance Training

Training of all store management and checker personnel was conducted in-store well in advance of the cutover.

"Our approach to checker training," Jensen said, "was to have our head cashier, Elaine Marchand, along with Univac's Carlene Thissen, conduct the training as a two-part team and it worked beautifully. We sought checkers that we felt had good attitude and personality, plus a high degree of manual dexterity, because we felt these characteristics were paramount to do a superior job with our new system.

Jensen said the result was a fast learning situation in a friendly, yet competitive environment. "Looking back, one essential ingredient which we feel was critical was having a vendor-specialist on-hand during the entire learning process. The other was having one of our own people as part of the teaching team. Our people knew her and could relate to her direction."

The Accuscan system installed at the Minnehaha Mall store includes:

- Dual control centers with dual computers and dual disks (96 tracks, 491K bytes). This allows full "redundancy," that is, the ability for one system to take over should the other fail. These data retention features provide virtual fail-safe protection for all sales data.
- Nine front-end terminals with alphanumeric customer displays plus cash and utility drawers.
- One office terminal.

The system has the ability to provide total sales analysis for up to nine departments.

Increased Productivity

"I know," Quisberg stated, "that our productivity has increased, but I haven't taken the time to conduct a formal study. More important to us is that we can get sales breakouts with a push of a button for up to nine departments, can determine, automatically, the number of people (and on a percentage basis) shopping by department, minute-by-minute and we know what's being bought and how much without taking a physical inventory. These capabilities were not possible with our previous system."

Quisberg has four stores in the Twin Cities with total gross receipts in excess of $25 million. His ambition is to have 10 to 12 stores within the next 10 years.

Electronic terminals are one way he hopes to cope with anticipated growth, through their ability to help control cash and maintain a more accurate and faster accounting system.

Bad Checks Caught

"Our Accuscan system," he said, "will not cause any reduction in staff. What it will do is increase the capabilities of what our people can accomplish and add to the scope of their contribution. For example, in one day we saved over $250 by detecting bad checks. This was possible through the combination of electronics and a special verification program in Accuscan that scans for previous bad check experience. You have to ring up a lot of sales to recover $250."

Quisberg plans to utilize further applications capabilities inherent in the present hardware and Alpha 3 program package, but wants to move at a rate that can be readily assimilated within his stores's overall system and accounting procedures.

In addition to the existing Alpha 3 program package, Sperry Univac has indicated plans to make available, later this year, supplementary function capabilities in what it will call Accuscan Alpha 4.

Quisberg anticipates using full scanning sometime in the future, but doesn't see the necessity right now.

B500

Intelligent Terminal
Expandable Memory

Beehive International's B500, an 8080A microprocessor based video display terminal, offers excellent system flexibility and an unmatched cost/benefit ratio. Features include an expandable program memory, data transmission to 19,200 bps, and Full Duplex/Half Duplex on-line operation. Other features: edit functions, RS232C compatibility, format mode, two pages of 25 lines by 80 character display memory, block transmission, addressable cursor, upper and lower case characters, scrolling, and eight video levels. Beehive's B500 also utilizes a detachable typewriter style keyboard with an 11-key numeric pad.

Many options are available to meet exacting customer requirements. Keystroke programming and download capability from an external data source are available with the extra RAM memory option. Other options include 256 programmable characters, programmable keyboard, output printer port and an auxiliary I/O port with either serial or parallel interface option.

BEEHIVE'S
B500
features

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- Addressable Cursor
- Keystroke Programming
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PIX-II is the industry's first virtual data link. That means it performs all of the functions of an SDLC network, but with none of the actual hardware or software required by IBM.

By removing all of the complexities between the byte multiplexer channel of your host CPU and the remote devices it communicates with, PIX-II makes those devices appear to the CPU to be in local mode.

Stop for a minute and think about what that means to your current and future plans for using 3270-type data entry devices. It means seven benefits that would otherwise be unobtainable anywhere.

First, it means you can build a 3270 network virtually overnight, regardless of your current processor model or software system, and without any front-end hardware or software. A PIX-II local controller installs on you CPU's byte multiplexer channel, taking the place of a 3272 local controller. A PIX-II remote controller installs at each remote site, with a 3272 local controller. The 3271 remote controller is eliminated. The installation takes a day, requires no software modification, and gives you—immediately—a completely operational 3270 network.

Second, that installation now puts all of your 3277-type terminals in local mode, as if they were right at your host CPU site, attached to a byte MUX channel.

Third, now that your CRT stations are in local mode, polling is totally eliminated. Every 3277 is served on a demand basis, as if it were the only terminal on the network. Nor is there any need for polling software overhead. You don't need it.

Fourth, the result of this systems configuration is improved response time for every 3277, regardless of its location. On average, that improvement will be about four times better than what you now achieve: from an average of eight seconds, to just under two seconds. For *every* 3277, consistently.

Fifth, no remote terminal access software is needed. None. No remote BTAM or remote TCAM if you operate under non-virtual methods. No VTAM and related NCP front-end software (there is no front-end) if you operate under virtual technology. That feature alone saves you months of effort.

Sixth, whether you operate under bisynch or SDLC now, PIX-II immediately gives you all of the benefits and speed potentials of SDLC, with no development work required. None. The PIX-II data link operates at speeds up to 56KB, so all you have to do is specify the type and speed of communications link—from a 1200 baud leased line to a 56KB satellite link. PIX-II takes it from there.

Seventh, putting up an instant 3270 network is just the beginnings of what you can do with PIX-II. Once it's installed, you can attach remote peripherals, HASP or JES work stations, console controllers, and even use it to develop a true CPU-to-CPU link without ACF.

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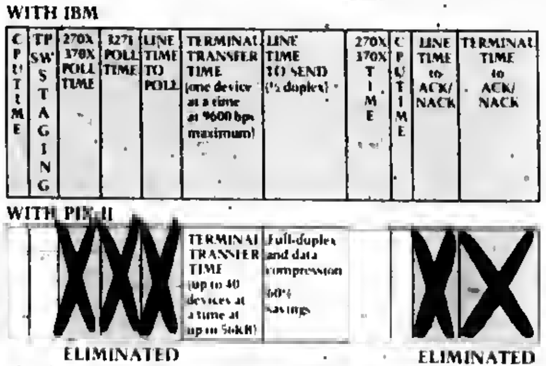
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The above illustration depicts the typical sequence involved in executing a single 3270 transaction under IBM protocol—and the many little ways in which PIX-II eliminates or reduces many of those sequences. Can you afford not to find out more about PIX-II?

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With Help of Terminal System

Sporting Goods Wholesaler Scores Profit Records

COSTA MESA, Calif. — A Southern California sporting goods wholesaler is running up a scoring record for itself in the profits column as a result of upgrading its DP facilities.

Munson Sporting Goods, which operates in seven Western states, expects the move from a minicomputer to a larger capacity on-line terminal-based system will improve annual net profits by an amount approaching six figures. The secret is improved inventory control of the 13,000 items the company stocks.

"It's simply a matter of having sufficient computing power to determine what to stock and in what quantities," according to Ken Roberts, Munson's controller, DP manager and chief architect of the new system.

"A year ago, our sales were slightly above $16 million, but we experienced more than $1 million in 'zeros' (a trade expression for customer-ordered items that are out of stock). Since back orders are practically nonexistent in our industry, an out-of-stock item usually means a lost sale. Now our annual zeros are half that rate and falling," Roberts noted.

The new terminal-based system, a Hewlett-Packard 3000 small computer, has also helped Munson reduce by 20% its total investment in inventory despite an expected increase in sales volume during the year.

Moreover, the HP system is helping Munson meet its objective of shipping customer orders within 24 hours after the order is received. According to Roberts, this service to its 2,300 customers is extremely important to maintaining customer goodwill.

Two operators at Munson use HP 2640 display terminals to enter order data from either customer phone calls or courier-delivered orders for Munson's line of hunting, fishing, camping, athletic and marine products.

To produce immediate response to customer requirements, Munson's 30 field salesmen are being equipped with Azurdata portable terminals.

"A salesman can transmit a day's orders to our computer in about three minutes," Roberts said. Salesmen are also given weekly microfiche inventory levels to help them speed the order planning and transmittal process.

"Our salesmen appreciate being relieved of paper shuffling. And our fast response is proving a formidable sales tool for them," he added.

As orders are received, inventories are automatically adjusted. Thus Munson's four service people, who have access to terminals, can respond instantly to salesmen or customer requests with accurate inventory information.

Packing slips, with items listed in the most efficient order for warehouse picking, are automatic byproducts of order entry, Roberts said. Once stock is picked, a duplicate of the packing slip is routed back to the DP center. It then serves as a source document for data update via a terminal to signal the HP3000 that an order is being shipped and to prepare an invoice.

Further HP 3000 byproducts are sales analyses, commission reports, acounts receivable aging and general ledger accounting.

Munson's system provides extensive support for purchasing functions, Roberts indicated. Purchase requests are automatically generated for new stock at the most economical quantities. Reordering is timed by the computer to mesh with the seasonal nature of sporting goods. Using the HP 2640 terminals, purchasing personnel may retrieve instantly a 12-month forecast of sales by item either in tabular or graphic format, he said.

Munson Sporting Goods Controller Ken Roberts uses the HP-2640 terminal to run budget and financial forecasts on the company's HP-3000 computer.

Munson's six HP 2640 CRT terminals are located throughout the company's combined general offices and warehouses here. The terminal can present up to 1,920 characters on its screen in a 24-line by 80-column format and it allows users to edit or modify data off-line before transmission to the processor.

In addition, eight special function keys may be user-defined to initiate routines such as forms entry or on-line error detection.

One of the HP 2640s in Munson's accounting department serves as an on-line entry station for inventory receipts, cash or check application and accounts payable entries. Still another terminal is reserved exclusively for program development.

Most of Munson's programs are written in Basic, some in Cobol, Fortran and RPG. Image/Query, the HP 3000's data base management system, serves as Munson's data base manager and allows on-line inquiry and entry using simple and logical English statements, Roberts said.

As Munson's controller, Roberts is one of the firm's most ardent on-line users of its HP 3000. His personal terminal is used for financial analysis and budget forecasting. Budgets customarily are established a year in advance by month by department.

As the year evolves, an actual item may differ from its budgeted amount, e.g., sales in particular month substantially in excess of the amount predicted. The budgeting program will then dynamically factor this excess into other related accounts, e.g., purchases, commissions and profits, and the adjustments will be incorporated into budgets for the remainder of the year, he explained.

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Users Seen Interested in Applications, Not Hardware

By John A. Hill
Special to Computerworld

There is a multitude of manufacturers of intelligent terminals. To succeed in today's marketplace, the manufacturer must have the ability to enhance a client's specific application to the point where the client no longer looks simply at the cost of the terminal but also considers the overall cost savings that can be achieved with a particular terminal.

In today's applications-oriented environment, customers are no longer just interested in hardware, instead, they want to know how a manufacturer can improve their overall operation from the standpoint of total cost savings, efficient utilization of personnel and prevention of premature hardware obsolescence.

In intelligent terminals there are basically two types of customers: DP managers and communications managers who have a good understanding of what they want to accomplish; and customers who have no knowledge of computers, DP or communictions but know their application in depth.

Those who have little or no technical knowledge look to the manufacturer for ideas and suggestions that will best meet their needs.

However, these customers usually have definite ideas about the type of display, clearness of character set, size of characters, keyboard layout, placement of special function keys, cursor movements, key colors, etc. These people are frequently more concerned with aesthetics than with actual operation, but the vendor still must be able to accommodate their wishes and desires.

For example, a terminal vendor must be ready to modify the keyboard to make it easy to operate. You may consider this an insignificant task, but to the customer it may be of paramount importance.

More Sophistication

As a whole, however, the users of intelligent terminals are becoming more and more sophisticated.

When buying a terminal they no longer just look at purchase price; instead, they consider the overall cost savings that can be achieved with a particular terminal.

A company making a substantial investment in hardware wants to ensure that the equipment does not become obsolete tomorrow but that, by simply reprogramming the terminal, the same piece of equipment can be used for many new applications.

Thus, hardware cost is no longer the key to the intelligent terminal marketplace. The real thrust is being able to evaluate a prospective customer's requirements, not only to meet his immediate needs but also to anticipate future growth where savings could be realized over a longer period of time.

Before committing themselves, prospective terminal users now analyze such things as operator intervention, speed of response, error checking capabilities and communications costs. In other words, they need to know the cost of operators, throughput, communications and other items where costs have risen at a yearly rate of 10% to 20% over the last five years.

Many companies use several different computer systems and are thus faced with operating and maintaining a mix of vendor equipment. To simplify their operations, they are now looking for hardware that can be configured to operate with different types of major computers, can handle different protocols and can be reprogrammed to handle new applications.

Ideally, a user would like to concern himself with only one vendor, one type of terminal, one service organization, one set of spares and one set of operating instructions. To satisfy these requirements, a single terminal must now be able to satisfy several different protocols. The Megadata 700/UETS (Universal Emulating Terminal System) is an example of such a terminal.

Intelligent terminal manufacturers are finding it increasingly more difficult to sell a standard terminal configuration. Most customers want a keyboard, color scheme and other features that are tailored specifically to their operation.

They are looking for a supplier who can discuss applications and come up with ideas and suggestions for improving operations. The vendor must provide improvements for specific tasks and, most of all, must furnish a terminal that can relieve the mainframe computer of many mundane and routine tasks. A customer also wants to be sure that a terminal buy will not force him to change his overall method of operation and his present host computer configuration.

Recent advances in technology and especially integrated circuits will make it possible in the near future to build an intelligent terminal with as few as five to 10 integrated circuits.

This opens a whole host of new applications and markets for the terminal manufacturer.

Who is to say, for example, that every home owner could not be a prime candidate for the purchase of an intelligent terminal system to keep track of his monthly billing, checking account, energy consumption or meal planning, etc.?

John A. Hill is vice-president of sales and director of marketing of Megadata Corp., Bohemia, N.Y.

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For 63 Terminals in Eastern U.S.

CRT Terminals, Not CBs, Mark This Modern Trucker

CHERRYVILLE, N.C. — If you're a modern trucker, you've got more than CBs these days. You've got CRTs — at least if you're Carolina Freight Carriers Corp.

The $123 million trucking firm has 150 Honeywell VIP 7700 CRTs at its headquarters here and at 63 freight terminals in the Eastern U.S. More than 110 of them are configured with receive-only printers.

"When we began our first application in April 1974 — administrative message switching — we removed telephone equipment that was costing us $12,000 a month and stopped using a slow-speed teleprinter service that was costing another $12,000 a month," according to J.M. Froneberger Jr., the company's assistant secretary and assistant vice-president in charge of data services.

"That, of course, didn't cover the entire cost of leasing the CRTs and data circuits, but they did provide us with other longer term economies. We can keep better track of our equipment and shipments now and give better customer service," he said.

Initially the company installed 80 CRTs and 70 printers. The other terminals were added gradually as the firm added new applications and opened new offices.

Communications Lines

The VIP 7700s communicate over three 4,800 bit/sec circuits and seven 2,400 bit/sec circuits (with from four to 18 devices per circuit) to a Honeywell Model 6040 large-scale computer that was upgraded last March to a Series 60 dual-processor Model 66/20. The three 4,800 bit/sec circuits are economical enough for local use — they are all within a one-mile radius of each other and in clusters, according to Froneberger. The company has recently added another five 2,400 bit/sec circuits for a total of 12 that are used for long-distance communications.

Each of the 63 freight terminals uses a CRT configuration that can range from a single VIP 7700 with printer at the smaller terminals to as many as five VIPs with printers at the larger terminals. Buffer sizes for the VIP 7700 and printer are 1,920 characters or one screen format. Each is separately addressable so a freight dispatcher can compose a message on the screen at the same time the printer is receiving a message.

The printers operate at 30 char./sec at the low-volume locations and 120 char./sec at higher volume sites. Usually one or two copies of a document are produced, but on freight bills one original and three copies are printed.

The system handles about 30,000 administrative-type messages and more than 35,000 transaction processing executive messages that update files each day. It runs around the clock, 365 days a year.

The remaining VIP 7700s and printers are located in the rating department, central dispatch control and other offices throughout headquarters such as sales, claims, revenoe. accounting, traffic and maintenance.

Carolina Freight added the second major on-line application to the system in March 1975. That was equipment, or dispatch, control that enabled the company to track tractors and trailers from trip origin to destination and to know within seconds if a shipment was in transit or if a trailer might be loading or unloading at either a terminal or a customer site, according to Froneberger.

Carolina Freight's Stoneham, Mass., operations manager John Willard uses a Honeywell VIP 7700 CRT to send information on trucks bound from the Boston area to the company's other freight terminals throughout the eastern U.S.

"It would also permit a dispatcher who needed special equipment, say a refrigerator trailer, to locate one immediately at the nearest terminal. Instant responses through the computer allow us to make firm commitments to customers on the first phone call and help us to be more competitive," he said.

On-line freight billing followed in September 1976. "That permitted us to get very close to oor business," he said. "We can now account for oor revenoe the next day after a driver receives a shipment instead of waiting ontil truck mail brings the papers to headquarters."

When a truck is loaded the driver brings the bill of lading to the loading freight terminal office where the shipping information is entered and transmitted to the company's general offices immediately.

Delivery copies also are transmitted to the destination freight terminal so when the long-haul driver arrives, freight can be onloaded, checked and transferred immediately to the firm's local trocks, whose loads already are planned, for delivery to customer sites.

"Besides letting us begin final delivery and billing procedores earlier, this application has improved procedures for handling costomer inquiries. We can identify any one of 100 or so shipments that might be on any particular trailer and provide immediate answers to questions," Froneberger said.

Rating Consolidated

Carolina Freight's next step was to consolidate the rating fonction at headquarters with the on-line system early this year. Prior to that the rate functions were performed at each freight terminal.

The 20 rating clerks at headqoarters call freight bill forms to their CRT screens, so the correct charges from the tariff books can be applied. The computer extends the charges and the invoices are ready to be printed in the next morning's batch run.

"Centralized rating made the process more efficient so we didn't have to add more people as work increased;"

(Continued on Page S/32)

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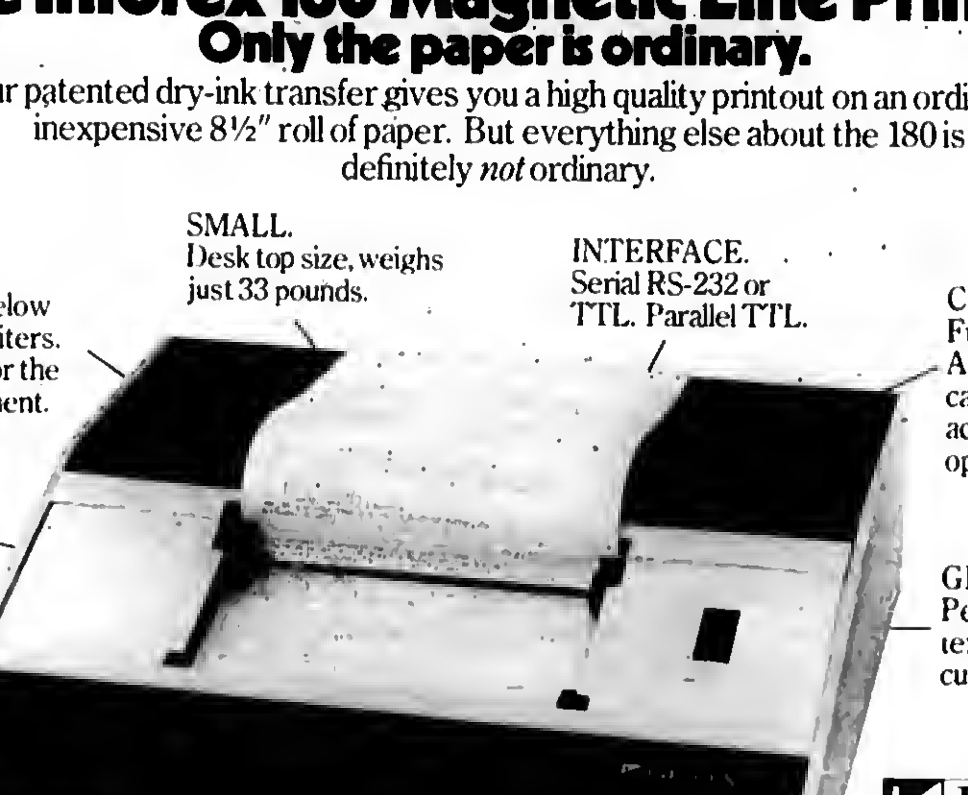

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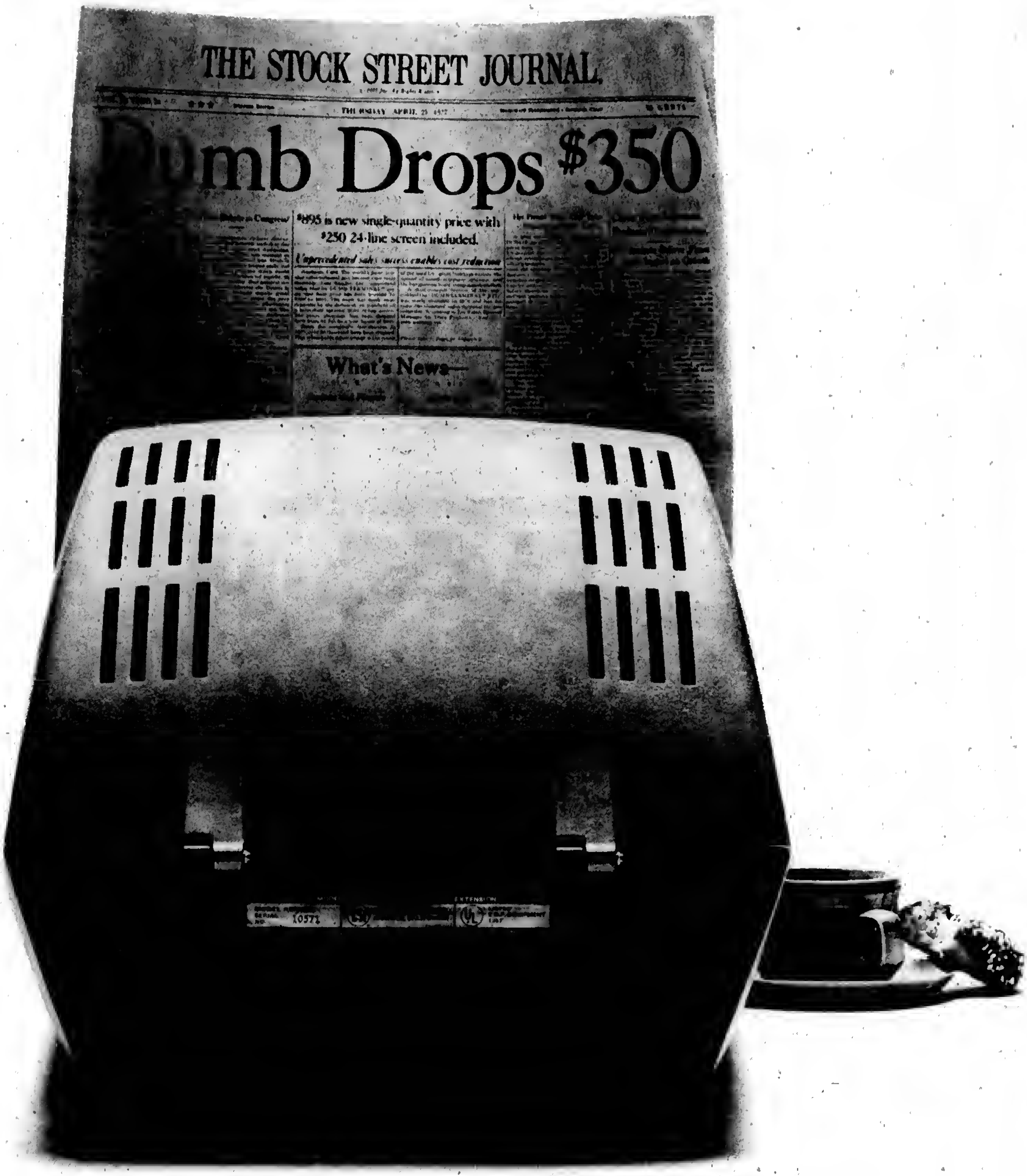
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In Nationwide Network

Concentrators Let Credit Firm Expand with Same CPU

ATLANTA — A network of programmable terminal systems, each with the ability to concentrate Teletype traffic, has enabled one of the nation's largest credit reporting agencies to expand its business steadily without upgrading its mainframe hardware.

Continued growth for Credit Bureau, Inc. (CBI) depended upon the number of Teletype terminals able to access its data base here containing pay history information on more than 40 million consumers.

Three years ago, that growth path looked uncertain. Although employment of time-division multiplexers had trimmed line charges between Atlanta and the 24 cities in which CBI maintained offices or sold services, the firm's operating system software placed limits on the number of devices its IBM 370/168 could address directly.

"We were operating our Teletype network under IBM's CICS, within a partition of OS/MVT," Randy Wewers, assistant vice-president of data processing at CBI, said. "With our multiplexing scheme, we had been able to attach approximately 1,000 Teletype terminals to our mainframe, but we found ourselves very close to the limits of our operating system."

Concentrators Chosen

One obvious if painful choice was able to attach additional Teletype terminals to a second mainframe. Instead, CBI chose to concentrate Teletype traffic through 24 PTS-100 programmable terminal systems from Raytheon Data Systems Co.

It was a logical decision to make for three reasons. The first was the cost of mainframe expansion. "We would have had to add at lease an IBM 370/168; more likely, another 168 — if we could have expanded our system at all, by going that route," Wewers explained.

Second, Raytheon provided a viable alternative for handling additional Teletype terminals because its PTS-100 systems were already in place, having been selected to replace IBM 3270 equipment at a cost saving of approximately 30%, he said.

"Third, Raytheon was the vendor that could do the job and we did look at others," Wewers added. "Teletype concentration was not a new concept. Raytheon had accomplished it earlier on its PTS-100 terminals emulating 2260 equipment. For us, they enhanced their 3270-compatible gear to do the same job, and, in the process, met some specific applications requirements we had relating to security procedures and the size of messages we had to handle."

The addition of a Teletype concentration capability to CBI's network not only allowed the credit reporting service to avoid adding additional mainframe processors, but also saved approximately 150K of core memory, freed roughly one-sixth of the capacity of its existing processor and eliminated several communications lines and a good deal of communications hardware, including nearly 150 communications adapters and numerous modems.

Since installation of the equipment began in mid-1974, CBI has more than doubled the number of slow-speed, low-cost Teletype terminals in place at retail stores, banks and other credit granting institutions in the markets CBI serves in the Eastern and Western U.S.

"The Raytheon systems have been a major factor in our ability to hold down the costs of the credit reporting services we provide," Wewers said, "and we expect that cost benefit will continue as our network continues to expand, almost daily."

Faster Responses Demanded

He explained that the trend toward automation in the credit granting industry began in the late 60s, sparked by the demand for faster responses to consumers applying for credit.

"Prior to that time, the pay history portion of the credit granting process had been handled manually. The credit granter would place a phone call to his local credit reporting agency. A clerk there would search a manual file, pull the record on the particular consumer, if such a record existed, and read that file over the phone," he said.

Wewers said the first wave of automation involved the installation of hard-copy de-

(Continued on Page S/33)

CRTs, Not Radios, Mark This Modern Trucking Company

(Continued from Page S/30)

Froneherger said. "It also increased accuracy in applying rates, since rate personnel specialize in handling tariffs between certain points.

A payroll reporting system for about 300 employees is already on-line. Hours worked are gathered from the terminals for the batch payroll system. Carolina plans to add the rest of the company's nearly 3,700 employees to the on-line portion of the system as well as other functions such as vacation or sick-leave accounting.

The terminals have improved the productivity of the company's DP department, according to Froneherger, since time-sharing provides a faster means of developing and modifying programs than the coding sheet, keypunch and run-when-you-can-get-the-time method.

The department consists of a director of DP, three systems/programming managers, six applications programmers, seven operators, one computer facilities manager and 28 others, including keypunch and document control clerks.

They currently are working on modifying other batch accounting and statistical programs for the on-line system. During the next two or three years they plan to modernize the accounts payable and accounts receivable programs; put the "over, short and damage" report on-line; and do further work in computerizing the tariff structure to allow the computer to do some automatic ratings.

Another on-line application Carolina hopes to add is a Zip Code delivery routing for local trucks. That would permit the freight terminal dispatchers to plan local deliveries even more precisely before the long-haul truck arrives.

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Concentrators Let Credit Firm Expand While Using Same CPU

(Continued from Page S/32)

vices, often IBM 2740-type terminals, at credit reporting agencies. "A phone call still initiated the inquiry, but the response was improved because the clerk at the credit bureau could key the inquiry instead of searching a paper file."

Video terminals at credit bureaus came next, with IBM 2260-type devices most popular. The next evolutionary step in the automation of pay history inquiries was elimination of the human "interface" between the credit granter and the reporting agency's data files. Banks and larger retailers began to install Teletype terminals, which provided faster access at reasonable cost when inquiries were keyed directly to credit bureau computers.

Wewers noted that only about 2,000 of the 40,000 total credit granters CBI units and customers serve have installed terminals. The remainder phone inquiries direct to one of CBI's eight regional offices or to one of the 16 independent credit bureaus who purchase services from CBI. Those inquiries are transmitted to Atlanta via Raytheon display terminals communicating in a 3270 mode. Teletype-generated inquiries provide the lion's share of the volume coming into Atlanta, however — almost 70% of the total number of inquiries made.

Expensive Overhead

That was the crux of CBI's problem: although Teletype inquiries were concentrated through strategically located, time-division multiplexers communicating with two Memorex 1270 front-end units, each port appeared, to the host, to have an individual Teletype terminal attached.

"Approximately 60% of the capacity of those two front ends was consumed by the 'handshaking' needed to support those Teletypes," Wewers recalled. "It was a tremendous hardware and software overhead burden, a very inefficient use of some very expensive resources. It made a great deal of sense to us to offload that traffic onto a less expensive device."

The network was upgraded by enhancing the PTS-100 with a function package consisting of a general-purpose communications adapter — a hardware interface between its system controller and a Teletype modem — and software to control the queuing in and out of Teletype message traffic. Five general-purpose communications adapters can be used with each PTS-100 controller, with each adapter able to handle four Teletype lines.

"All a credit granter has to do now is turn on a paper tape, key in identification and security codes, then key in the inquiries — as many inquiries as he wishes," Wewers explained. "He then dials the local credit bureau and places the phone in a telephone coupler or switches on the local low-speed data set. The PTS-100 answers automatically."

Messages travel from couplers over asynchronous lines at 110-, 300- or occasionally 1,200 bit/sec rates to low-speed modems at the PTS-100 locations, and those modems link directly to general-purpose communications adapters in the terminal system controller.

Sign-on information is transmitted directly to the host for authentication, after which inquiries, written into 256-byte buffers associated in PTS-100 memory with ports on the communications adapters, are transmitted to the 168 in Atlanta at rates of up to 9,600 bit/sec.

"We installed a Comten intelligent front end here to replace our 1270s," Wewers said, "with additional Comtens in Washington, D.C., and San Jose, Calif., to concentrate messages from Raytheon terminals emulating 3270 equipment. But all the host eventually 'sees' are what appear to be individual 3271 controllers, even though each controller may be handling as many as 20 Teletypes."

Credit granters see momentary pauses because inquiries are transmitted, processed and answered over the comhination slow-speed, high-speed route in 256-byte blocks. Response times at Teletype terminals reportedly will improve when the network is upgraded to a double-buffering scheme. Double-huffering will enble each PTS-100 controller to receive a 128-byte response from the 168 while transmitting the previous 128-hyte block to a remote Teletype terminal.

Automation in general has allowed CBI to consolidate into eight regional centers from more than 100 offices operating previously.

While some of those sites have only one PTS-100 system controller, others have as many as four, with terminal counts ranging from five to 43 and from one to seven 165 char./sec printers.

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Firm Builds SDLC Net Without Vtam/NCP Upgrade

BUENA PARK, Calif. — Yamaba Parts Distributors, Inc. has established a cross-country communications network employing Synchronous Data Link Control (SDLC) protocol without implementing IBM Vtam/NCP software.

Avoiding that software upgrade saved months of programming time and effort for the company, according to Wayne Mitzel, manager of data communications at Yamaha. Monthly operating costs for the network are approximately half the costs of similar land line links, he said.

The company established communications links via satellite between an IBM 370/145 at corporate headquarters and warehouses serving the Southern and Midwestern states. The satellite links support both remote batch communications from card readers and printers and inquiries from 3270-type interactive terminals, under full-duplex SDLC protocol.

Central to that network is PIX-II, a minicomputer-based "virtual data link" from Paradyne Corp. By supplying intelligence at all points within the network, PIX-II allows remote peripheral devices to operate as if they were locally connected to a mainframe, Mitzel said.

"We installed a PIX-II local control unit at headquarters and remote control units at both warehouses," Mitzel said. "Our programming effort at the central site was completed within half a day. We simply had to reassemble our DOS supervisor to give it some new addresses and to reassemble our terminal control program under CICS."

Mitzel said Yamaha could have implemented SDLC either over land lines or via satellite. Either route would have required implementation of Vtam/NCP.

"Both packages consume core and computer cycle time," he explained. "The programming effort would have required months worth of time and effort — compared with days to implement SDLC using Paradyne equipment."

Mitzel added that implementation of SDLC would also have required hardware upgrades at the central and remote sites. "We would have had to upgrade our front-end controller, which was sufficient for binary synchronous communication but not for SDLC. By using the Paradyne system we were able to eliminate our front-end controller altogether."

Implementation of SDLC would also have required that remote batch equipment be upgraded to the SDLC equivalent. "Instead, we saved some by replacing our equipment with card readers and printers," Mitzel said.

Each week, Yamaha headquarters transmits to each warehouse a master inventory list for that location. Reports transmitted each morning from headquarters allowed warehouse managers to update that master list. That updating was done manually prior to installation of on-line CRTs with the PIX-II system.

Mitzel said the SDLC satellite network made possible by the PIX-II system provides response within an average of three seconds to inquiries from any remote warehouse to master files.

"A warehouse manager can now tell a customer on the phone whether a part is in local stock or in stock at another location. Having that up-to-date information close at hand allows our regional warehouses to provide a better response to the customers they serve," he said.

Prior to installation of the PIX-II system, Yamaha warehouses transmitted remote batch data over Wats lines at speeds of 4,800 bit/sec. Mitzel said the company upgraded to 9,600 bit/sec to accommodate 3270-type interactive terminals.

"Communication over land lines at that speed might have given us better terminal response times," he suggested, "but an average three-second response is very acceptable when you consider the cost savings afforded by satellite over land line communications."

Satellite communications links cost Yamaba approximately $1,500/mo. Mitzel said the cost of additional land lines needed to support interactive termianls would have been approximately $3,000/mo.

Original Goal

The ability to transmit inquiries from warehouses to the central data base had been Yamaha's original design goal, but that goal was rejected as too costly. Binary synchronous communication was too slow for the application, Mitzel noted, and SDLC appeared to require a major programming effort in addition to hardware upgrades.

Yamaha briefly considered the compromise of installing intelligent terminal systems at each warehouse, in order to maintain separate data bases for each location. Each data base would have contained up-to-date information on local inventory.

"That would have given us some improvement; but the inquiry capability would have been less than we really wanted and would still have required a significant programming effort. With PIX-II, all we have to do to add another warehouse to our network is install another remote control unit and plug in our peripherals," Mitzel stated.

Teleprocessing systems such as Btam, Tcam and Rtam are associated with specific devices, and each time a device in a network is changed, the software associated with that device must be changed. PIX-II eliminates the need for both front-end control units and teleprocessing software, he said. Host processors communicate through PIX-II local and remote control units to remote peripherals as if those devices were directly attached to the host.

In Yamaba's PIX-II system, data transmitted from the IBM 370/145 host is stored in buffer memory until an SDLC frame is assembled with each device buffer tagged with an address. Data is compressed and transmitted from the local to the remote control unit in seven 256-byte frames and passed from the remote control unit to peripheral devices attached to that unit at each warehouse.

"I found the PIX-II concept hard to believe, at first, but since installation last fall the system has run with very minimal downtime. It seems that for us, PIX-II represents the easiest, most effective method of establishing satellite networks," Mitzel said.

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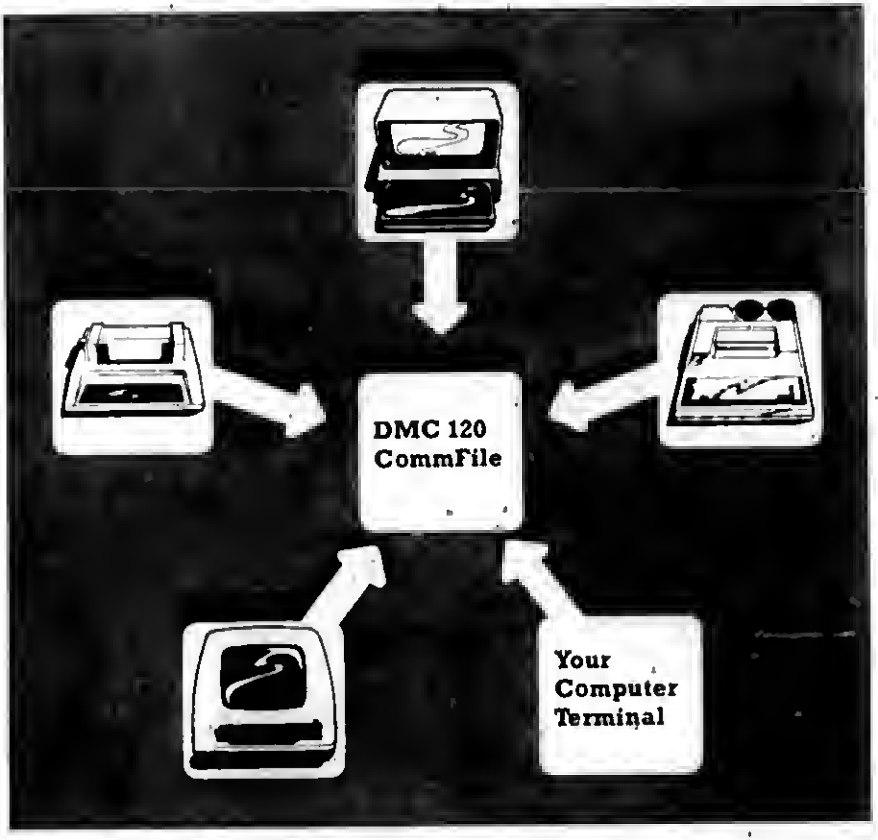

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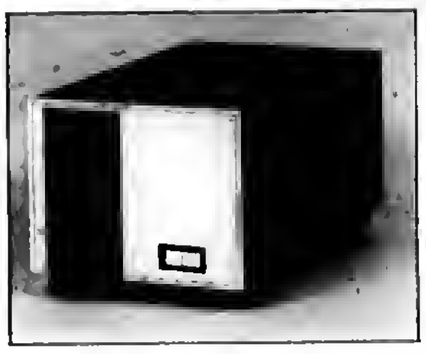

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Remote Intelligent Terminals Seen Acting as Management Aid

By Fonnie H. Reagen Jr.
Special to Computerworld

Once, it was considered the height of system design sophistication to poll managers to determine their "information needs" and then to devise a set of reports that provided as many managers with as many of their requests as was practical. It was rather like giving a child his choice of as many candies as he could name — managers named all the pieces of information they could.

Cleverness in system design resulted in many combination reports that gave individual managers a different set of information pieces than they had requested. Data input followed the same pattern.

Managers had to provide some information that would be used to create information relationships, not for themselves, but for others. Computer usage thus developed under the control of a central facility with the sources and users (the managers) of the processed information frequently only peripherally involved in the system design.

The need to efficiently administer an expensive resource — the computer center — led to reduction in repetitious data storage and data manipulation through the development of data base management, which separates data processing activities from the data storage facility. A parallel hardware development has substantially reduced the cost of electronic circuits and small data storage devices.

Pressure on Remote Locations

One effect of these two developments has been to create pressure for the remote locations to reenter the field of system design.

The most obvious example of this trend is the positioning of intelligent (or programmable) terminals in remote company locations to provide access to the corporate data bank. The combination permits local management much flexibility in acquiring, storing and processing information and therefore should allow better decisions to be made.

Central management is under dual pressures because of the development of distributed processing and data bases. One side is that described above, the provision of local management with better tools to keep track of day-to-day operations and to make better decisions.

The other side is the desire to use the corporate data bank and processing capabilities to provide information processing on a corporate basis. Allocation of corporate resources, measurement of company effectiveness and control of company cost parameters all require detailed knowledge of what the company has done, what it is doing and what is is committed to do. Resource allocation also demands knowledge of the effects of planned future activities.

In general, the sum of all the information available to individual managers is used for corporate information needs.

This sets up a dual set of needs for local management: use of the comptuer to further understanding of day-to-day activities and to report to the central site for corporate information needs. This leads to the logical conclusion that one terminal in the local office should serve several purposes.

It is conceivable that a single monolithic set of application routines could be written to completely model a company's business within the fremework of a single "program." It would provide a single interface for the terminal with all information requests, data input, report output and data base updates handled by a single application system. However, this is unlikely.

A company's business is understood too incompletely to make a precise model. In addition, the company environment is too dynamic to permit a single model to remain unchanged. A general-purpose model is too inefficient.

Rather, we are faced with something with which we have always been faced: the development of multiple application systems as they become needed, as the people resources become available to implement them and as our knowledge of business and computers grow to the point of understanding the application.

Central System Architecture

Given the inevitability of multiple-application systems, each with the need for remote input and interaction, the question arises: What central application system architecture will best satisfy the needs?

Multiple terminals can be located at each remote site, each interfacing with a single application system, but the cost penalty of duplicated terminal equipment is obvious. Using a single terminal to interface multiple application systems introduces the additional host overhead to manage the interfaces, a cost that is not so obvious.

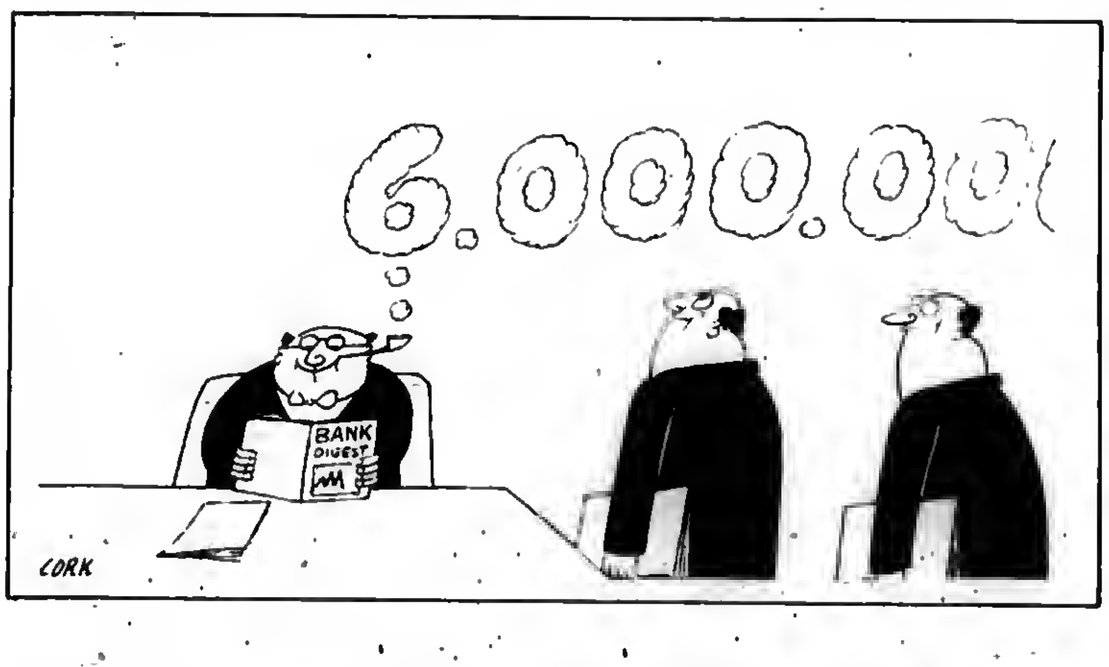
Additional decisions, such as determining application type, add to the system processing load, and a larger central computer is required just to maintain the same level of information processing. (The growth of main memory and CPU usage for the modern multitask operating system is ample testimony of the cost of implementing general-purpose capabilities.) That cost is justified on the basis of increased productivity and flexibility.

The availability of low-cost intelligent terminals makes multiapplication terminals practical. Tailoring functions of specific applications at the terminal site, rather than through host processing at the central site, almost eliminates the normally-expected increase in system overhead when converting to a "general-purpose" approach.

The extra cost of an intelligent terminal, compared to a nonprogrammable terminal, is easily offset by the reduction in the number of terminals required.

The net effect of multiapplication terminals implemented via programmable units is to improve information flow, data retention and data organization at the remote location while collecting the information the company needs for corporate analyses.

Fonnie Reagan is managing editor at Datapro Research Corp., Delran, N.J.



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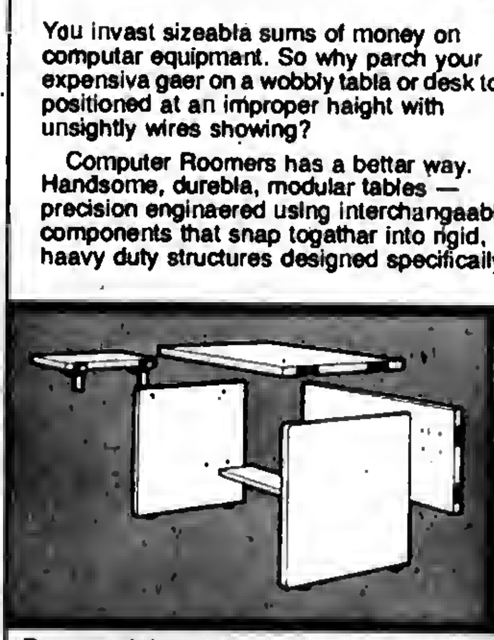

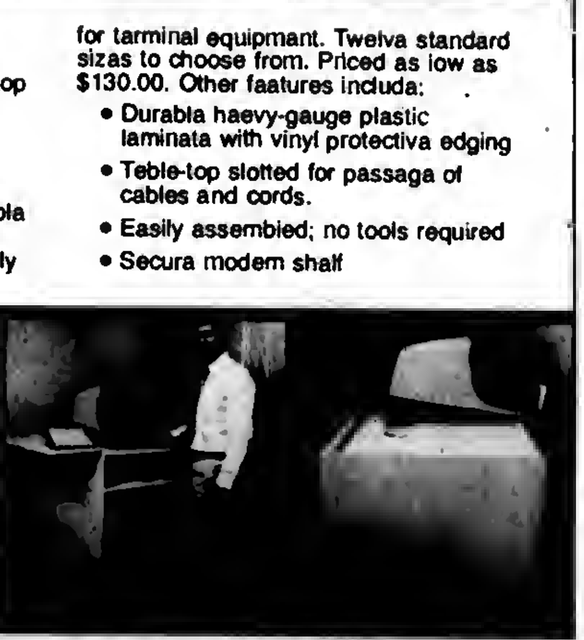

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Slate Terminal System Handles S&L Transactions

DAYTON, Ohio — A service owned by nine savings and loan associations in the Dayton area is making it possible for customers to withdraw or deposit funds to their accounts at their supermarkets.

Named Slate (an acronym for Savings and Loan Automated Teller Exchange, Inc.), the service includes remote service units (RSUs) at the courtesy counters of local food stores which are on-line to a central DP center. Customer transactions are immediately debited or credited to appropriate accounts.

While they are associated for purposes of Slate, the member institutions are independent in all other aspects, including maintaining their own DP systems, according to Douglas R. Gannon, president.

One association uses the services of American Financial, in Cincinnati, as its computer center. Four others use the Savings and Loan Data Center in Cincinnati, which is a part of Automatic Data Processing. The remaining four associations use the NCR data center in Dayton.

"The associations were content with their DP services," Gannon recalled. "It would have been foolish to disrupt their systems to consolidate them all in one system just to handle the debit cards. Instead, we decided to interface with their systems."

To do this, Slate had to communicate with a conglomeration of equipment. American Financial uses an IBM 370/145 computer mainframe with a Periphonics Corp. front end. The FDS/I terminals are programmed to look like IBM 2980 terminals going into the front-end system.

Savings and Loan Data Center has a Burroughs B500 mainframe with a Varian Data Systems V72 front end. It uses a mixture of terminals — NCR 270 and Burroughs TC700 — so several protocols are used. The NCR Data Center uses an NCR Century 300 mainframe and NCR 270 and 279 financial terminals.

"We had a choice of establishing our own data center or buying shared service," Gannon noted. "We did not feel we wanted to go to the expense of equipment, people and software to build our own center. Instead, we surveyed a number of services and settled on the NCR data center here in Dayton."

In addition to being local to Gannon's operations, he said, NCR offered to underwrite the cost of developing the software to make the system operate. The software remains proprietary to NCR; however, Gannon feels it was a profitable trade-off for both Slate and NCR.

Software Objectives

One of the primary software objectives was the development of an electronic switch which makes it possible for any customers of any of the associations to use any of the in-store terminals. The switch software includes a file of tables which relate each card number to the issuing association.

Upon confirmation from the association's computer, the switch transmits confirmation back to the terminal, then debits the customer accounts and credits the store's reconciliation account.

The switching function is complicated by protocols. In one case, the NCR computer has to look like an IBM 2980 when it completes a transaction. In another, it has to look like a modification of an NCR 270 financial terminal, and in the third, like a "pure" NCR 270.

"The software is flexible enough to add a module into the switching system to look like whatever terminal an association utilizes," Gannon said. "When the data centers get our message, they treat us as if we were just another branch and some more tellers that have been added to their system. The switch then reformats the message for our terminals and sends it back out in the response."

Slate is one of only two such systems in the U.S. that utilizes an electronic switch, Gannon noted. The function can be performed by inserting hardware between the Slate CPU and the associations' data centers. Memory was available on the NCR data center's computer, though, so it was decided to use a partition of the NCR 300 computer as the switch.

Supermarket customer transacts business with savings and loan association through use of "Cash Plus/Prestige" card which gains access to system. Salesperson then enters transaction into NCR 279 financial terminal.

Furnishes Terminal Equipment

Slate furnishes all terminal equipment for use in the stores. Card verification is done through identikey units. These units use the card number and any combination of letters or numbers as the customer's personal identification number (PIN). The card number and PIN are fed into an algorithm which results in a third number. This number becomes the customer identification to the computer.

To make customer operation of the PIN entry pads simpler for the customer, Gannon changed the key caps from an adding-machine-style keypad to Touch-Tone telephone style because he felt it was better for the general public and would result in fewer keying errors.

Transactions are completed on NCR 279 financial terminals which Slate installs at the stores' courtesy counters. "These were one of many units we could have used," Gannon recalled. "A number of sites we visited were using them, so we knew they worked. But also important to us was the fact that very fast maintenance service was available."

Interassociation transfers were also a consideration in the design of the software system. Each of the associations and merchants has its own banking affiliations, Gannon said, and the intent was not to disturb these relationships just for the Slate service. Instead, the settlement transfers are handled in the Slate system using the commercial bank clearing system.

The Slate data processing system operates an hour longer than the stores are open each day to allow completion of cash

(Continued on Page S/37)

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Using National Statistics

Terminals Help Patients Determine Life Expectancy

By Ann Dooley
Of the CW Staff

MADISON, Wis. — Patients at the Adult Medicine Clinic here can determine on a computer how long they have left to live and what they can do to prolong their lives.

The program shows people who are basically healthy how their living habits and medical history will affect their life expectancy, according to Dr. Larry Van Cura, a university professor.

The health hazard program consists of national statistics compiled at Methodist Hospital in Indianapolis on the most common causes of death, according to age, sex and race.

There are 15 major causes of death, some of which are auto accidents, suicide, homocide, accidents, pneumonia, stroke, leukemia and coronary artery disease.

These causes are correlated with risk factors such as use of alcohol or tobacco, miles driven, whether seat belts are worn, amount of exercise, blood pressure, serum-cholesterol, height and weight and medical background, Van Cura said.

The health hazard appraisal is an attempt to convey information to people about what the state of their health actually means in the long-range view, according to Van Cura. "We are trying to help well people stay well," he said.

Once people know the risks, hopefully they will change their behavior, he added.

Youth-Oriented Society

"We live in a youth-oriented society and when you tell someone they have the same risk of dying as someone older than they are, it makes them think," he said. "Probably more people are going to raise their level of health by decreasing risks than by any other method so far," Van Cura said.

Other medical centers use the same risk factor analysis, according to Van Cura, but Wisconsin is the only place where the patient directly accesses the computer.

The clinic has used patient/computer interaction for more than 10 years and patients often prefer the anonymity of the machine, Van Cura pointed out.

The patient types the answers to questions appearing on the screen of a Hazeltine 2000 CRT. It amounts to a 20- to 25-minute interview, he said.

The information includes questions on health patterns, medical backgorund and cholesterol level and blood pressure, if it is known. If it is not, it is added later after an examination, he explained.

The data is transmitted to a time-sharing computer at the University of Wisconsin Computer Center where the patient's results and risk of dying in the next 10 years are compared with the national average.

The computer is programmed to indicate the patient's physical health age. It also indicates which factors are most critical to that individual's health and what would most likely cause his death.

Both good and bad habits are taken into consideration before a prediction is made, Van Cura said.

The program has only been in operation since the first of this year but several hundred people have already used the computerized health hazard appraisal, he said. Eventually, he believes, such clinics will be available in the home by using a television screen to communicate with a main computer.

It is still too early to determine if the health hazard appraisal has changed people's actions and bad habits, according to Van Sura, but a follow-up study is being planned to find out if any beneficial changes have occurred.

Slate Data Terminals Track S&L Records

(Continued from Page S/36)

drawer balancing. At the end of the day, reports are printed for all associations and files are updated.

By the time the associations open the next morning, they have completely updated files and a complete audit trail of the previous day's transactions, according to Gannon.

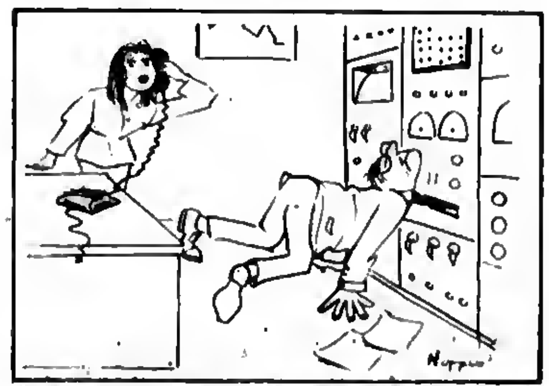
Daily Reports

The stores also receive daily reports on their terminals' activity, though neither the customer names nor association identifications are given. The reports, however, mirror the journal tapes in the NCR 279 terminals, so the stores can check the reports by sequence number.

"There was also a decision about what kind of cards we would use," Gannon reports. "Eight of the associations were Transmatic licensees for Prestige cards, and one was not. Geoffrey E. Hill and Associates, Inc., a consultant in Columbus, Ohio, designed new cards with the Prestige design and the words "Cash Plus" on the face. The back of the card has the Cash Plus Money Center design we chose for Slate.

Slate provides a complete service to associations using it. In addition to the data processing and card design services, Gannon's organization also trains both association and in-store employees and promotes new store placements and card use. It also secures licensing from the Federal Home Loan Bank Board for both new store placements and associations joining the network.

Now that the system is operating, Gannon expects to expand it to other thrift institutions in the area. "We've designed a very flexible system that gives the thrift institutions a lot of advantages without disrupting either banking affiliations or data processing operation," he concluded. "And we look for more to join Slate as our card base and supermarket locations grow."



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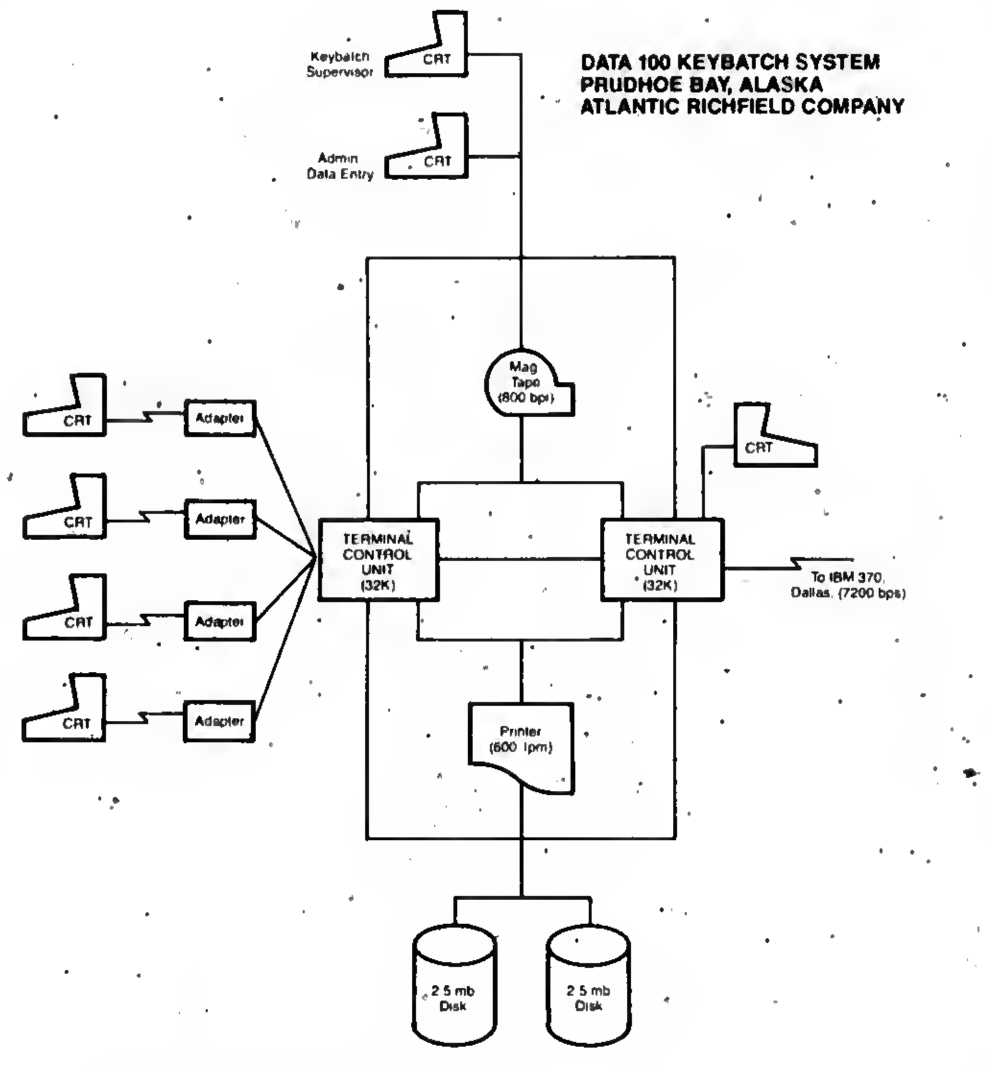
Arco Alaskan Terminal Network Keeps North Slope Oil Flowing

At Prudhoe Bay on Alaska's North Slope, drilling operations, production facility testing and other procedures are now producing oil for the Trans Alaska Pipeline.

One of the major owner companies involved is Atlantic Richfield Co., which operates the east side of the oil field. To effectively operate in this hostile environment, Atlantic Richfield performs around-the-clock preventive and remedial maintenance, material management and administrative programs. These systems use two Data 100 Keybatch remote terminal systems located in Alaska and connected by satellite telecommunication to an IBM 370/168 computer in Dallas.

The system enables Arco's Prudhoe Bay operations personnel to plan maintenance activities (workload leveling, reserving spare parts) and to follow correct job procedures (required tasks, skills and tools), while ensuring that maintenance is scheduled at predetermined intervals on equipment representing a large investment.



The system is also used to capture data concerning remedial maintenance performed. Management reports are produced which reflect the degree of adherence to schedules and to track equipment performance.

One Data 100 Keybatch system was installed in October 1976 in Anchorage. It is used mainly for processing administrative data. The second Keybatch system was installed In December 1976 at Prudhoe Bay. Each system has its own dedicated 7,200 bit/sec satellite channel which interfaces with Arconet, the company's private communications network.

According to H.M. Haseltine Jr., manager of systems and programming in the administrative department of Arco, the economics of operating on the North Slope dictate that required equipment maintenance be performed with as few people and as little paperwork as possible.

"This means developing a multifunction data entry/remote job entry system that minimizes DP throughput time in what amounts to almost a real-time environment," he said.

Arco initially looked for a single terminal which would provide the capability for both on-line interactive processing and remote data/job entry to support the batch environment. However, this was not possible with the hardware available then.

The compromise solution was two sets of hardware, Keybatch terminals supporting the remote entry and IBM 3275s supporting on-line functions.

The system at Prudhoe Bay consists of a central unit at the operations center and remote keystations at the activity locations. These remote stations are located in warehouse areas, maintenance shops and potentially at other major production installations.

These operational areas are linked to the central terminal controller/processor through the local microwave communication system. Communications capability, therefore, was an important factor in equipment selection.

The central terminal system in the opera-

(Continued on Page S/39)

'There Is Quite a Conflict Between Our Systems and Operations People.'

With Remote Batch Equipment Doing Preventive Maintenance

(Continued from Page S/38)

tions center consists of dual Keybatch terminal controllers with data channel, a 600 line/min printer, two 2.5M-byte disks, 800 bit/in. magnetic tape, various communications controllers and adapters and administrative and supervisory keystations.

All master files for Alaskan preventive maintenance are kept in the IBM 370 in Dallas. These define Prudhoe Bay equipment with regard to place, maintenance requirements and job history. The 370 automatically schedules jobs and sends job summaries to the remote site so that maintenance personnel can plan their activities.

The user at Prudhoe Bay has the option to decide what jobs he wishes to work on in a daily or weekly period. He may cancel, reschedule, initiate or substitute jobs as he sees fit. He enters transactions to the system through input of a job number followed by a key word and description. From this data, master files in Dallas are updated and job support documents are generated, where required, and transmitted back to the Keybatch printer at Prudhoe. An activity report regularly shows current status of each job.

The remote site operator may do both online inquiry and batch data entry. For online inquiry, the operator uses an IBM 3275 under CICS software. For batch data, such as transactions to update the master file, the operator keys in the transaction to the central Keybatch system where it is accumulated on the disk.

At some point during the day, whenever volume dictates, the central Keybatch terminal operator transmits the batched data to Dallas with the appropriate job control language to execute the catalog procedure for initial job processing.

When the master file updates are complete, the remote stations can do inquiries against the new data base through the 3275s.

The Anchorage installation has a dual-processor terminal system with a 450 card/-min card reader, a 9-track 800 bit/in. magnetic tape, two 600 line/min printers, a 10M-byte disk and four local Keybatch keystations. A peripheral switch between the two processors allows them to share common peripherals. Transactions from Anchorage involve administrative, production and payroll data, in addition to scientific applications such as reservoir engineering and geophysical modeling.

In addition to communicating via the 7,200 bit/sec dedicated satellite to Dallas, the Anchorage system has a dual-modem switch that enables switching over to a 4,800 bit/sec voice-grade dial-up line on the dial-up phone network. Thus, the system can interface with any data communications network having a comparable communications arrangement.

Hazeltine said that one of the main reasons why Arco chose the Keybatch system was operating system version 3.1, which contains a "communications save" and a "communications restore" software feature. It allows data to be transferred disk-to-disk on any Data 100 multifunction product in the Arco network.

An operator can do a communications save for any particular data set. This transmits the data set to an output queue on the 370 and then on to whatever terminal site needs the information, thus eliminating transferring hard copy, he said.

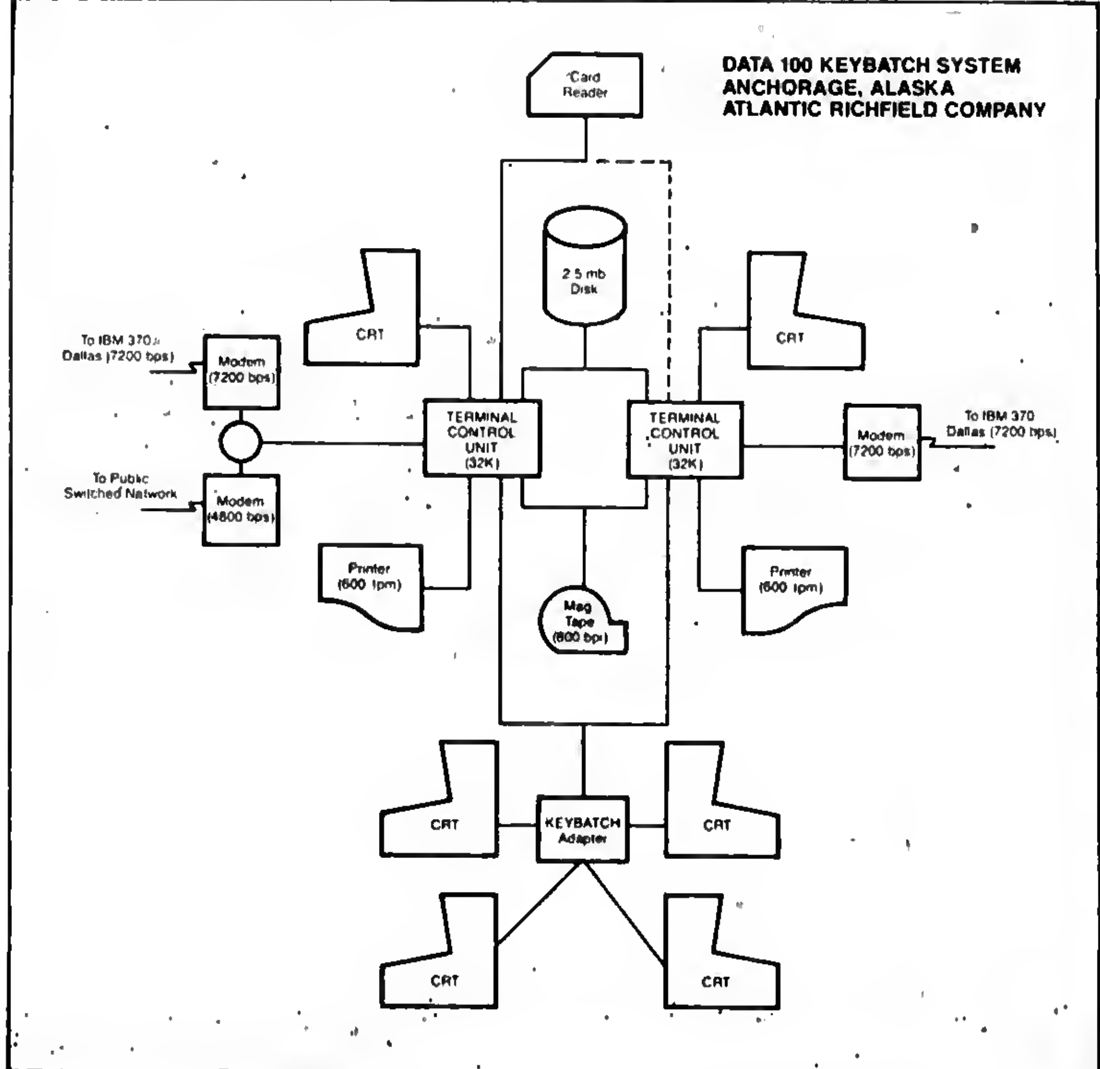
Arco has developed application software interfacing the material management system for automatically expediting the issue of parts needed in maintenance. When the preventive maintenance section has decided what job has to be done, the 370 automatically generates a parts picking ticket which is transmitted to the designated storeroom, giving location of job, identification of parts and quantity.

Storeroom attendants pick the parts and deliver them to a staging area so they are ready when maintenance personnel arrive to begin the job. When the job is complete, data is entered into the system indicating parts used and manhours expended, from which a history file is created in the mainframe.

Hazeltine said they use practically all the software functions available on the Keybatch operating system. The number of batches submitted from Prudhoe will average 20 per week, depending on master file maintenance volumes and on-request needs.

The multi-function Data 100 systems in Alaska, combining data entry and communications functions, serve as part of a system which provides high-speed filing systems and "alarm clocks" to facilitate the efficient performance of maintenance work.

Thus, the systems contribute to more efficient operation and reduction of operating costs in the harsh environment of Alaska's North Slope, Hazeltine said.



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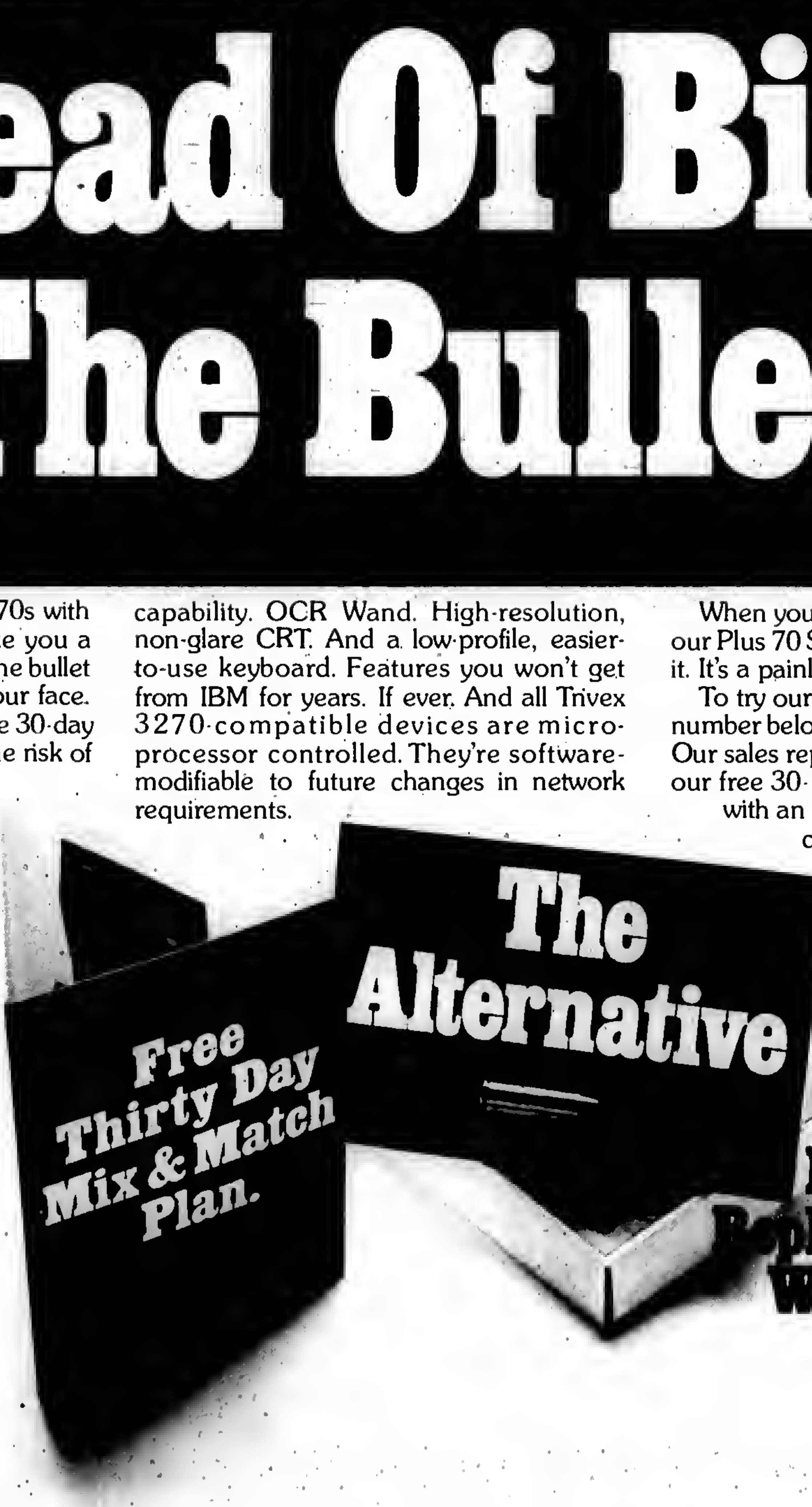

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COMPUTER INDUSTRY

CCIA and Others Testify

S.285 Would Put More Monies in Small Businesses

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Too many private pension assets are tied up in large, secure corporations, leaving little of this money to be invested in small and medium-sized businesses, several proponents of a bill that would alter that situation told the Senate Finance Committee and the Select Committee on Small Business here recently.

The current distribution of these funds is both "inequitable and imprudent," according to A.G.W. (Jack) Biddle, president of the Computer & Communications Industry Association (CCIA).

The CCIA, MRI Systems Corp. chairman Alfred A. King and Cummins-Allison Corp. president John E. Jones testified in support of S.285 known as the "Tax-Exempt Private Pension Investment Act of 1977. "S.285 would put investment limitations on large pension managers so private pension plan participants would not find their money tied up in a few corporate stocks.

Small and medium-sized businesses would benefit from the passage of the bill, sponsored by Sen. Lloyd M. Bentsen (D-Texas), because more pension monies would be freed for investment on their ventures, Biddle suggested. The availability of pension funds would help these businesses solve part of the overall problem of capital formation which threatens their existence, he added.

The present situation is one in which "small and medium-sized businesses have been stalled and shut off from funds badly needed for productive growth [and] are not able to contribute their full share of vigor to the american economy," King told the senators.

The MRI chairman stated it is the small growth company, and not the mature dominant one, which brings innovation and new technology to the marketplace.

"I am sure that fund managers have a myriad of defenses for the close relationship that exists between them and large corporations. None of them, however, can be persuasive against the very real threat to the economic viability of the U.S. and to our free enterprise economic system," King said.

"Fortunately, America has not lost its entrepreneurs," he maintained. But as reasonable after-tax guards continue to be taken away from the entrepreneur, "There is no more incentive for the individual who sticks his neck out."

From King's viewpoint, S.285 "confronts head-on the issues of reducing the interrelationship between the [Private Pension] institutions and large corporations and returning the flow of equity capital to smaller businesses."

Favoring the "carrot" to the "stick" approach, however, King added the sale of securities of large corporations might be taxed at a low rate for the capital gains they produce or might be permitted on a tax-free basis if the funds are reinvested within a defined period of time in small or medium-sized businesses.

Also testifying in support of S.285, Cummins-Allison's Jones told the commit-

(Continued on Page 38)

What's at Stake

S.285 would put an excise tax on pension managers, effective Dec. 31 of this year.

If the bill is passed, a 5% tax will apply on investment if the pension assets are greater than $1 billion, if investment is in a corporation with a capital account greater than $150 million and if, as a result of the investment, the manager has greater than 5% of any class of the corporate security.

If this "violation" is not corrected within 180 days, S.285 calls for the levy of a tax of 100% on the investment.

Lower Prices, More Capability Highlight Dumb Terminal Moves

By Molly Upton
Of the CW Staff

While denials of a price war abound among terminal makers, there is no dearth of action in the low end of the product lines.

The evolving trend is twofold: lower prices for bottom-of-the-line products, as from Lear Siegler, Inc., and more capability for the same price or less, as from Infoton, Inc. and Beehive International, Inc.

Lear Siegler, which recently dropped the price of its bottom-of-the-line ADM-3 terminal to $895, contends the unit isn't the cheapest and the firm doesn't intend to have the lowest prices, according to Lee Falco, vice-president and general manager of the Data Products Group. "We're shipping all we can right now," he said.

However, other vendors expressed surprise at Lear Siegler's ability to cite such a low price because it uses distributors rather than direct sales.

Falco said he doesn't know of any price war — "no more than usual" — and added he doesn't encourage bottom-line pricing.

Factors contributing to the price cut were advances in technology and competition. "Let's face it, if it weren't for competition our price would be $1,295," Falco said.

Prices on dumb terminals will probably stabilize for the next 12 to 18 months, Falco said, and then technology will bring more price reductions.

Dave Zeiter, product manager for terminals at Beehive International, agreed prices on low-end terminals have stabilized for a while, adding there will likely be a price break on other terminals next spring.

Thanks to increasing use of semiconductor components there will be increased capabilities on terminals at a lower price than presently, he said.

The number of features offered within the past year on Beehive's low-end terminal have grown by 20%, but the price hasn't changed, he noted. These features include blinking, cursor control and format control whose capabilities are provided by the semiconductor components.

Most of the firm's sales of dumb terminals are in the $800 to $1,000 range, he said.

Infoton's approach is exemplified by its

(Continued on Page 38)

HIS vs. Arizona Continues

PHOENIX — Attorneys for plaintiff Honeywell Information Systems, Inc., defendant State of Arizona and intervenor Sperry Univac recently met in a crowd-packed court here to present verbal arguments in HIS' suit against a state computer procurement.

Following the oral arguments, the judge took the matter under advisement and issued a preliminary injunction barring the State of Arizona from awarding the contract until he makes a ruling.

HIS had previously obtained a preliminary restraining order after learning it had lost a state contract to Univac, despite the fact its bid was lowest.

The request for proposal (RFP) was for a replacement for an IBM 370/145 used by Arizona to participate in a nationwide job-matching network. Participation in the Economic Security Automation Plan (Esap) is funded by the Department of Labor but administered by the individual states [CW, June 20].

RFPs issued last January resulted in bids from HIS, for a 66/10 at $661,171; from IBM, for a 370/148 or alternatively for a 370/158 at $2.1 million; from Univac, for a 1100/80 at $1.4 million; and from Comdisco for a 370/158.

HIS was advised it had the lowest submitted price for that particular element of the procurement — the mainframe and memory components, according to an HIS spokesman.

Following the submission and opening of the bids, however, IBM announced its nationwide price decrease for the 158s.

HIS and the other vendors were subsequently informed by letter that all bids were rejected by the Arizona Department of Administration based on a determination that it was in the public interest to have a rebidding, presumably because of the reduction in 158 prices.

A second round of bids was submitted April 25. HIS changed its proposal to a 66/40, which it felt was comparable to a 158 in performance, priced at $1.01 million. Univac rebid the 1100/80, but lowered the price to $1.3 million; Comdisco bid its 158 at $1.3 million; and IBM rebid a 158 but dropped its price to $1.5 million, he said.

HIS was then informed by the purchasing section of the State of Arizona that the 66/40 bid was "nonresponsive" and therefore would not be considered for contract award.

HIS protested the refusal, resulting in the restraining order.

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'Crazy Quilt' of Laws Hit for Frustrating U.S. Trade

WASHINGTON, D.C. — Special-interest laws and shortsighted governmental policies are dulling the American competitive edge in world markets, especially in advanced technologies where the U.S. excels, according to Charles Wohlstetter, chairman and chief executive officer of Continental Telephone Companies.

Wohlstetter singled out communications and data handling, which are not labor-intensive but draw on high technology, as foreign trade areas that offer particularly good opportunities for American participation. A "crazy quilt" of conflicting laws and policies, however, is frustrating the best intentioned efforts of industry to exploit these opportunities, he said at a recent seminar here.

Citing the German, French, and Japanese governments in particular, Wohlstetter said they enthusiastically support their own industries in recognizing that many foreign sales depend on financing and extended terms as surely as favorable interest rates and payment schedules affect the saleability of a house or car.

"In the years from 1970 to 1976, the volume of Japanese exports has increased at twice the rate of our own. In four of the last 10 years, the value of U.S. imports has been greater than our exports. This year's deficit could easily be larger than any in the past," he said.

Perhaps the most crippling blow ever struck against U.S. export trade came with the passage of the Tax Reform Act of 1976, Wohlstetter said. Three of its most damaging features were the recapturing of the previously deductible corporate tax credit on foreign losses, the elimination of the special tax benefits awarded to U.S. companies in developing nations and — worst of all in his opinion — the lowering of the earned income exclusion for U.S. citizens working abroad.

The last provision, Wohlstetter said, has resulted in an outflow of American engineers and administrators during the last year from the Middle East, the fastest growing world market. Since extra compensation to redress the high expense of foreign living is now taxable, an American firm can hire approximately two and a half British engineers for the price of one from the U.S.

This deprives American telecommunications companies of a prime competitive advantage, the ability to export qualified people to manage, operate and maintain the systems they sell overseas, he stated.

Low-End Terminal Mart Active

(Continued from Page 37)

1200, a terminal with an end-user price of $1,195, which is less expensive than its predecessor GTX model although the unit offers more features, according to Ed McCormack, director of marketing.

Other firms such as Hazeltine and Applied Digital Data Systems have done the same thing, he observed.

Although Infoton's price on the 1200 drops to $850 in quantities of 100, McCormack said, the firm has no plans to announce a "rock-bottom low-end terminal." It's much tougher to make a profit in the barebones area since profit depends heavily on volume, he said.

The majority of Lear Siegler's terminal business is in the dumb terminal area, although the firm has announced its entry into the intelligent field with its Video Display Processor 400.

In the year just completed, the firm sold about $30 million in CRTs and is now shipping over 2,000 unit/mo. This figure will probably approach 3,000/mo by the end of the year, Falco said.

Beehive's Zeiter said his firm decided not to go after ADM-3-type business because it wants to keep a decent margin for its distributors.

Although Beehive's B100 is selling well, Zeiter said he does not consider it a direct competitor with the ADM-3 because it is field-upgradable.

People like the idea of the cheapest price, but they also want 30% more features at a least-cost price. Many of these select the B100, he said.

Out of its entire terminal line, about half the shipments are in the low-end teletypewriter arena, he said, whereas this probably contributes only 35% to revenues.

Beehive plans to definitely ship more than twice as many dumb terminals as last year, when the B100 was not in full production, Zeiter said.

S.285 Puts Capital In Small Businesses

(Continued from Page 37)

tees his company "has been limited to debt financing to sustain its steady growth of between 10% and 15% per year.

"With a more favorable investment climate, with the availability of external equity capital to Cummins, I feel its growth rate could increase to 25% to 35% over the next three to five years," he said.

The Cummins-Allision president identified other needed steps in pension and capital formation reform. These included a reduction in the cost and amount of federally required paperwork and a return to lowered taxation of capital gains.

Jones also cautioned the committee members that while "elimination of the double taxation of dividends may also provide some relief, such tax reform would tend to benefit only the larger companies who are able to pay dividends.

"Growth companies cannot afford to pay out substantial dividends, if indeed they can pay them out at all, since the earnings before any declaration of dividends must be used to finance growth," he added.

"We cannot trade capital gains reform for the elimination of double taxation of dividends. [This] would further isolate the small and medium-sized companies from the capital markets. And the capital drawing power of the large corporations over the financial markets would be assured," Jones maintained.

Returning to S.285 and emphasizing the duty of the pension manager toward the people participating in the private pension plan, said, "We may realize that the present conduct of the portfolio manager is defensive in nature, but it is certainly not defensible conduct in view of the pensioner's entitlement to the best yields he or she can get."

S.285 is a "much needed first step toward a reform of the too conservative standards of the pension funds," Biddle stated for the CCIA.

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- The evaluation and selection process — a case study.
- Minicomputer maintenance — analysis of possible methods (vendor maintenance, independent service organizations, and end user self-support) with an eye to cost savings.
- Minicomputers in distributed processing — stand alone and communicating.
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F&S Sees Militarized DP Mart Growing at Annual 12%

By Toni Wiseman
Of the CW Staff

NEW YORK — Militarized computers represent a substantial and growing market — one that will grow from slightly over $400 million in 1977 to more than $650 million by 1981, according to Frost & Sullivan, Inc. (F&S), a market research firm here.

The growth, which averages approximately 12% per year, is attributed to the increasing complexity of military systems, increasing costs resulting from inflation and the increased utilization of computers as components of subsystems that previously used special-purpose computational and control elements, an F&S report noted.

F&S defined a militarized computer as one "designed to meet military performance specifications in terms of ruggedness, [mean time between failures, mean time to recovery] and environment; general-purpose in nature, i.e. programmable; primarily digital; and identifiable as a separate and distinct element of any system or subsystem in which it is used."

The Air Force's B-1 bomber, a major program for that segment of the armed forces, will demand 5,000 computers of varying sophistication, the report said.

Total Air Force computer funding was projected to rise 68% in the 1977-81 period for a cumulative budget of $1.0 billion, with aircraft and avionics systems accounting for 50% of the total.

Avionics R&D budgeting during the five-year period will account for $68 million, the study noted.

The Navy and Marine Corps will spend approximately $915 million during the five-year period, with combined aircraft/-avionics programs emerging as the primary Navy submarket. This submarket will grow at a rate of 56% during the period to $420 million, F&S predicted.

Army computer expenditures are expected to grow 57%, reaching a total of $705 million for the period. Here again the aircraft/avionics submarket will lead, with weapon control/command control and missile systems computer needs following.

"There is a strong and increasing trend toward standardization throughout the Department of Defense. At the same time, there is an increasing trend toward proliferation of computer types by industry as microprocessors are used in a wider range of systems," F&S noted.

"As recently as a decade ago, the military computer market was dominated by a relatively small number of firms that had the resources to design and support state-of-the-art computer systems.

"Today, low-cost reliable integrated circuits, microprocessors, memories and related devices open up the market to a much broader range of companies," F&S stated. In recent years, it added, the challenge of militarized computer design has shifted to the mechanical packaging with the electrical design playing a much smaller part.

DataComm 78 Set for February

WASHINGTON, D.C. — Some 75 companies, 250 speakers and 4,000 data communications professionals and managers are expected to be on hand for DataComm 78 when it is held at the Sheraton Park Hotel here Feb. 21-23.

Several members of the DataComm 78 advisory group have been named, including Thomas Pyke of the National Bureau of Standards, George Berstein of the Naval Supply Systems Command, Elizabeth Severino of EFS Associates and Fred O'Keefe of the Association of Data Communications User.

This year's program will be broken into three segments. A "basics" program has been designed for users who are not yet using data communications. Sessions will deal with planning, selecting and implementing data communications systems.

A series of in-depth workshops will provide information on narrowly defined fields such as network analysis; data communications software; and terminal, modem and multiplexer capabilities.

Finally, the conference will feature product "rap sessions" during which a panel of vendors and users will discuss trends in 18 product areas.

The fee for the conference and exhibit is $45 for one day, $115 for all three days. Further information is available from Ed Halsted at The Conference Co., 60 Austin St., Newton, Mass. 02160.

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OEM Sales Flourishing

Paradyne Seeks Unique Solutions in Communications

By Toni Wiseman
Of the CW Staff

LARGO, Fla. — Paradyne Corp. views its role in the industry as a provider and developer of products that offer unique solutions to many of the most common and complex tasks in computer-based data communications systems — for both end users and OEMs.

Robert S. Wiggins, president, said the company's strategy has been to provide product innovation in three ways:

- First, by identifying and committing early to technologies that appear to have broad future potential.
- Second, by incorporating features in its products that substantially reduce the complexity a user would otherwise encounter in performing data communications tasks.
- Third, by enhancing the functional range of its products well beyond the performance specifications of products offered by other suppliers.

A privately owned firm, Paradyne had revenues of $10.7 million last year and expects to grow between 30% and 35% annually, according to Jay Hill, vice-president of marketing.

Paradyne's revenues are derived from two product lines — high-speed modems and PIX II, Hill noted.

PIX II is a virtual data link system which allows IBM 360/370 users to perform remote processing over a variety of communications media, such as dial networks, private land lines, digital networks and satellite facilities.

Paradyne concentrates on high-speed modems, mainly 9,600 bit/-sec and some 4,800 bit/sec units, an area it plans to expand in with microprocessor technology, Hill said.

Modems account for a third of the firm's U.S. revenues and half of its international revenues. A large portion of its sales are OEM, he said, noting three OEM contracts alone — with Burroughs Corp., Nippon Electric Co. and L.M. Erricson — will amount to $5 million over the next few years.

Aside from AT&T, Paradyne's main competition is Codex and Milgo in the 9,600 bit/sec market and Milgo in the 4,800 bit/sec arena, he said.

"We're much more aggressive than anyone else on purchase prices," Hill stated. "All our competitors put out high-quality products, so we have to use all the marketing strategies we can, and one is to stimulate sales through prices."

Paradyne's lease pricing is also very close to most others in almost every situation, he noted.

"Our modems are known to have one functional advantage over others — they work on unconditioned lines better than anyone else's," Hill claimed.

OEM Business

OEM sales account for about 25% of Paradyne's business, according to Robert Budenstein, director of OEM international sales.

On the OEM side, modems comprise the majority of sales as both users and manufacturers become aware of technology advances and what these advances can mean in operation.

"Users, for instance, are becoming more sophisticated and understand their own needs better. They don't just buy the newest product in a manufacturer's line anymore," Budenstein stated.

Paradyne, he indicated, is now providing terminal manufacturers with the ability to Integrate high-speed communications capability into their terminals, tailored to their needs and in such a way as to provide the end user with a total single-vendor capability.

Integrated modems are becoming more and more viable for terminal manufacturers, he asserted.

"With the introduction of LSI there were less things to go wrong. And with the introduction of minis combined with LSI technology, we have a situation which says there are a limited number of printed circuit cards to do the job, so servicing becomes easy — in many cases simply a case of finding the bad card and replacing it on the spot," Budenstein said.

Maintenance no longer requires a highly skilled technology-oriented engineer, he added.

Taken as a whole, this means the user can demand a protective umbrella — one phone call to one vendor when something goes wrong, be it in the terminal or the modem.

"Paradyne has the expertise in-house to provide, modify and manufacture communications equipment tailored to the needs of the terminal maker. This means the manufacturer doesn't have to refit the terminal to the modem, which is a lot different than buying an 8080 chip off the self," Budenstein said.

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*(Published quote of an independent computer expert. Name on request.)

Mainframers' Ink Runs Black in First Half

•IBM Net Grows 11%

ARMONK, N.Y. — IBM Corp.'s six-month results for worldwide operations benefited from a 10.8% increase in gross income from rentals and services.

Earnings for the quarter ended June 30 rose 11% to $658-million or $4.44 a share compared with $592.8 million or $3.95 a share during the same period last year. Earnings in the first quarter of the year rose only 5.3%.

Revenues grew to $4.419 billion, up from $4.014 billion in the year-ago quarter.

For the six months, earnings climbed to $1.23 billion or $8.26 a share based on an average of 149.2 million outstanding shares. For the same period in 1976, earnings totaled $1.14 billion or $7.57 a share on 150.2 million shares.

Revenues for the six months were $8.509 billion compared with $7.828 billion in the year-ago period.

Gross income from rentals and service rose 7.5% for the six-month period to $5.467 billion, up from $5.083 billion. Income from sales totaled $3.042 billion compared with $2.744 billion in the 1976 half-year.

For the quarter, sales income rose 14.4% while rental and service income grew 7.6%.

"Outright purchases of data processing equipment for the second quarter increased substantially over the levels of both the first quarter of 1977 and the second quarter of 1976," according to Frank T. Cary, chairman of the board.

"Incoming orders and shipments continue to show good increases over the comparable 1976 periods," he added.

•NCR Sees 86% Increase

DAYTON, Ohio — A surge in earnings from overseas operations contributed to an 86% increase in earnings for NCR Corp. during the second quarter.

Earnings soared to $34.4 million or $1.23 a share compared with $18.5 million or 72 cents a share in the year-ago period.

Revenues also rose — 13% — to $627.8 million, up from $556.3 million a year ago.

Second-quarter results brought six-month earnings to $51 million or $1.84 a share, a 61% increase over the 1976 half's $31.7 million or $1.26 a share.

Revenues for the period climbed to $1.14 billion, an 11% increase over the 1976 half's $31.7 million or $1.26 a share.

William S. Anderson, NCR chairman, said that although the company's U.S. operations were the largest contributor to second-quarter earnings increases, net income outside the U.S. was also well ahead of last year. This contrasted with this year's first quarter, in which earnings outside the U.S. were relatively flat.

"Better business conditions were reflected in a high level of shipments of computers and terminal products during the second quarter," Anderson said. "A second favorable factor was improvement in margins resulting from manufacturing cost-reduction programs."

He also cited improved profit contributions from the field engineering and Appleton Papers divisions and from Data Pathing, Inc.

"We anticipate continued good earnings growth in the third and fourth quarters. However, the percentage gains are not expected to match those of the first six months, since earnings in the last half of 1976 were considerably stronger than those of the first half," Anderson said.

Incoming business in both the second quarter and six months was ahead of last year's bookings, he added. "With a generally favorable economic outlook and a record number of new product introductions, we expect 1977 bookings to exceed those of any previous year," he said.

NCR's expenditures for research and development for the first six months were $55.8 million, an increase of 31% over the $42.4 million spent in the first half of last year. For all of 1977, R&D expenditures are expected to reach $120 million.

•CDC Earnings Rise 26%

MINNEAPOLIS — Control Data Corp. reported consolidated earnings of $14.6 million or 85 cents a share for the second quarter of 1977, a 26% gain over the $11.6 million or 67 cents a share in the year-ago quarter.

This figure included earnings of $9.8 million from CDC's Commercial Credit subsidiary.

Computer business revenues for the second quarter were $369.8 million, up 10% from $335.1 million for the same period in 1976.

For the six months, CDC's earnings rose 21% to $26.3 million or $1.52 a share compared with $21.7 million or $1.25 a share in the year-ago period.

Half-year revenues reached $708.0 million compared with $641.7 million in the first six months of 1976.

William C. Norris, chairman, noted that CDC continues to experience improved business across a broad range of computer-related products and services. As a result, second-quarter computer business earnings totaled $4.8 million vs. $2.8 million for the second quarter of 1976.

Computer services were a particularly strong contributor to the improved second-quarter results, Norris added. In particular, data services revenues, aided by a number of new products, grew 22% compared with the same quarter a year ago.

Earnings in the third quarter may not show an increase over last year's 87 cents a share, he noted, because of the particularly strong results in the computer business in last year's comparable quarter.

Nickels & Dimes

Centronics' board of directors approved a 5-for-4 stock split in the form of a 25% stock dividend payable Oct. 4 to holders of record Aug. 29. A cash dividend of 25 cents a share payable on all shares outstanding after the split, including the new shares, was also voted.

$$$

Wyly again extended the expiration date of the exchange offer for its 7-1/4% convertible subordinated debentures due 1995 and its 4% convertible subordinated sinking fund capital notes due 1983. The new expiration date is Sept. 30.

$$$

Raytheon declared a quarterly dividend of 25 cents a share payable July 27 to holders of record July 8.

$$$

AVX has declared a quarterly dividend of 8 cents a share payable July 28 to holders of record July 8.

Acquisitions

Itel Corp. has acquired **Facts Nationwide Teletype, Inc.**, a privately held DP company that provides industry information to coin dealers throughout the U.S. Itel has also purchased the **Margin Monitor System** and operations from Bank Computer Network Corp.

Alanthus Corp. has agreed to acquire all of the outstanding stock of **MI2 Corp.**, a manufacturer of data communications equipment, from Motorists Development Co., a subsidiary of Motorists Mutual Insurance Co.

EG&G, Inc. has agreed in principle to acquire **Quality Measurement Systems, Inc.** The transaction will involve an exchange of EG&G common stock for all the outstanding shares of Quality stock.

Automatic Data Processing, Inc. (ADP) has completed the previously announced acquisition of **First Data Corp.** for 302,345 shares of ADP common stock.

NLT Computer Services Corp. has signed an agreement to purchase the Washington, D.C., Memphis, Tenn., and Beloit, Wis., offices of Analysis and Programming Corp. of Greenwich, Conn.

U.S. Datacorp has acquired certain assets as well as the commercial computer output microfilm business of **Trusco Datacorp**, a division of the Trust Co. of Georgia.

Datatrol, Inc., a subsidiary of Applied Devices Corp., has purchased inventory, tooling, capital equipment, patents and rights to the **Amcat** product line of terminals and systems from Addressograph Multigraph.

Pertec Computer Corp. has acquired **Mits, Inc.** The agreement calls for the exchange of 746,154 shares of Pertec common stock for the approximately 966,900 shares of Mits currently outstanding.

System Development Corp. has acquired the **Stockmaster Division** of Space Application Corp.

W. Ardis Lowrey, chairman and president of Digital Development Corp., has acquired the stock holdings of two minority shareholders and thus has become the sole owner of **Digital Development**, a San Diego-based disk memory manufacturer.

Horiba Instruments, Inc. has acquired the **Vehicle Emission Computer Systems** business of Interautomation.

Informatics, Inc. has acquired **Management Horizons Data Systems, Inc.** from FNCB Capital Corp., a subsidiary of Citicorp.

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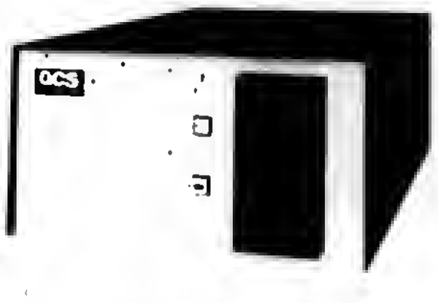

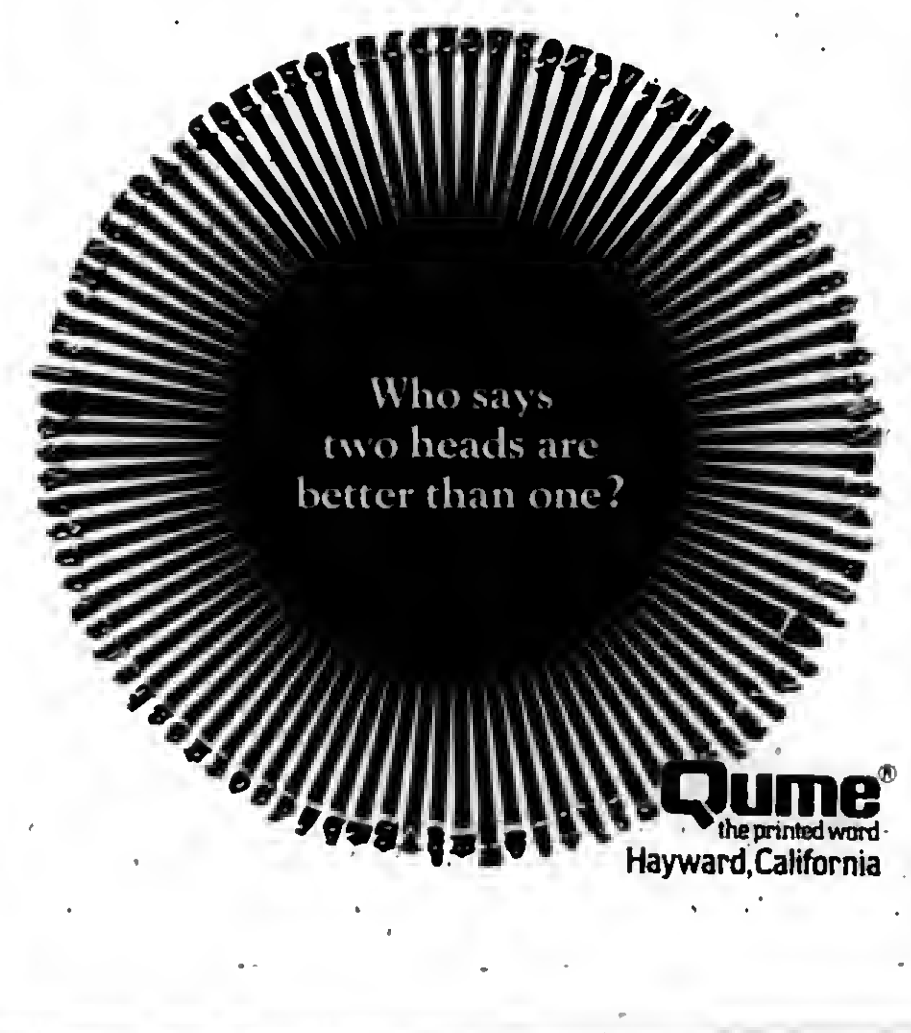

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Survey of Industrial Firms

Micro Use Seen Growing, Diversifying

FRAMINGHAM, Mass. — Microcomputers have proven their worth to industry and in the future will become much more prevalent — and not necessarily only as dedicated control devices, according to market research involving industrial manufacturing firms.

The survey, conducted by the Nigberg Corp. here, sought to measure attitudes toward micros in a broad range of industrial markets, ascertain how micros are typically evaluated and highlight attitudes towards specific micro features.

On a base of 494 respondents, 60% indicated they were currently using micros and 17% said they were planning to use them.

Of these respondents, 30% indicated they were proficient in microcomputer design from the ground up and 22% indicated they were proficient in system design. Only 5.3% expressed no familiarity with micros at all, according to Nigberg.

The most popular reasons for using micros in a product were to reduce cost and increase product capability, the survey found.

Microcosm

Eight-five percent of the micro users develop software for their systems in-house, primarily because they feel they do a better job, Nigberg said. Assembly language was far and away the most popular programming language used (57.1%).

When evaluating new microcomputer equipment, 73.1% of the respondents indicated that two to four people were involved. A large task force of five or more people evaluates microcomputer equipment in only 14.4% of the responding companies, while close to 12% of the respondents indicated that a single individual conducts the evaluation, the survey showed.

Given the criteria of price, the specific application, equipment brand name, reliability and performance, the most likely criteria for recommending purchase were specific application and performance, rating 47.8% and 22.5% respectively, Nigberg found.

Other research findings were: price is not the most important factor in micro evaluation; micros are not necessarily best used with a larger host computer; low-cost memory is an important factor in the growth of the microcomputer; modular expansion is important; and micros should have their own high-level langauge developed for use in applications.

NEC Has Thimble Printers

LEXINGTON, Mass. — NEC Information Systems, Inc. has introduced a line of character printers, utilizing a "thimble" printing element, that print a 128-char. set at up to 55 char./sec.

The thimble elements last about 50% longer than many wheel-type printers, according to the firm.

The Spinwriter series includes five models, all of which are microprocessor-controlled.

Features include a choice of five standard interfaces, 10- or 12-pitch characters, Ascii compatibility and numerous typefaces, the firm indicated. Custom interfaces are also available.

Model 5510 is a receive-only printer; 5520 a KSR unit; 5530 a word processing unit; 5540 has a split platen; and 5500 is a basic OEM unit.

The Spinwriter features a rotating thimble, electronically driven print hammer and servo motor-controlled positioning system.

The units require no lubrication, NEC said.

In lots of 100, prices for the 5500 through 5540 range from $1,140 to $2,600. Deliveries are expected to begin in October from NEC Information Systems at Five Militia Drive, Lexington, Mass. 02173.

Intel Unveils Software

SANTA CLARA, Calif. — Intel Corp. unveiled two software related systems: a real-time control package for SBC 80 and system 80 packaged systems; and a faster mathematics unit.

The RMX/80 real-time multitasking executive is modular and users can link on task modules. The nucleus modules require 2K bytes and contain task-to-task and I/O communication, real-time clock control, interrupt and priority resolution, Intel said.

Bootstrap devices are not required, since all or part of the total program can be stored in erasable programmable read-only memory (Eproms) or read-only memory (ROMs), according to the firm.

Optional modules include a diskette subsystem, a free space manager and a software debug program.

Intel's Intellect Microcomputer Development System supports generation of RMX/80 systems and development and use of a library of task modules, the firm said.

Initially, RMX/80 runs on 8080A-based computers. It costs $1,950 including all modules and a year's free update service, Intel said.

The SBC 310 High-Speed Mathematics unit from Intel's OEM Computer Systems Group enables SBC 80 computers to perform mathematical operations an order of magnitude faster than with microprocessor software, the firm said.

Multiple processors can share the unit via Intel's Multibus.

The SBC operates concurrently to the SBC 80 computers. It costs $595 in single quantity and is a 6.75-in. by 12-in. board assembly, Intel said from 3065 Bowers Ave., Santa Clara, Calif.

Zilog Offers Z80-MCS

CUPERTINO, Calif. — Zilog, Inc.'s Z80-MCS microcomputer system includes the Z80 CPU, a disk controller, 16K bytes of dynamic random-access memory (RAM) and 3K bytes of programmable read-only memory (Prom), which contains basic routines such as system debugger, floppy disk driver, console driver and bootstrap routines.

The unit is in a 19-in. chassis with 600,000 bytes of dual floppy disk storage. It can address 64K bytes of main storage and has an RS-232 or current-loop serial interface, the firm said.

The system cost of $6,000 in single quantity includes documentation covering both hardware and software. Optional software includes Basic and MCS-Rio. MCS-Cobol is scheduled to be introduced in the fourth quarter, the firm said.

Zilog is at 10460 Bubb Road, Cupertino, Calif. 95014.

8X300 Prices Cut

SUNNYVALE, Calif. — Prices have been reduced 40% on the 8X300 microprocessor from Signetics Corp. to $48.75 in quantities of 100 to 999.

The bipolar unit has a fixed instruction set and is optimized for control applications, the firm said.

Typical applications include peripheral controllers, data communications, CRT terminals, power control systems and entertainment devices, the firm said.

Signetics is at 811 E. Arques, Sunnyvale, Calif. 94086.

6800 Gets Floppy

SAN DIEGO — A single or dual floppy disk system for the Motorola 6800 microprocessor is available from Electronic Product Associates, Inc.

The unit is equipped with drive electronics, power supply, controller and exorcisor-compatible interface for the 6800 along with floppy disk operating system, assembler and editor.

The price is $2,595 for the single drive and $3,295 for the dual-drive system from Electronic Product Associates at 1157 Vega St., San Diego, Calif. 92110.

Portable Console Supports OEM Tests

SANTA CLARA, Calif. — Intel Corp.'s uScope 820 microprocessor system console is a portable system developed to support OEM test and maintenance.

The unit contains an 8085 and initially handles systems based on the 8080A.

Diagnostic routines can be executed while the system under test is running in real-time under control of its own microprocessor, Intel said.

The uScope Probe 8080A is supplied with a keyboard-display overlay and personality read-only memory (ROM).

Intel plans a package of diagnostic routines for the SBC 80/1 and a probe, overlay and ROM set for the 8085 micro and 8085-based single-board computers.

The 820 can be used to monitor, display and alter register memory and I/O values and to control operations including halt, single-step, run with display and run in real-time, Intel said.

The 820 console panel includes hexadecimal as well as binary displays. The entire unit costs $1,520, while the uScope Probe 8080A set costs $480 from the firm at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Intel Adds 8085-Based Units

SANTA CLARA, Calif. — Intel Corp. has brought out lower cost versions of its single-board computers utilizing the 8085 processor as well as other products based on the 8085.

The SBC 80/04 costs $99 in OEM quantities or $195 for one unit and operates on a single +5V power supply.

The SBC 80/05 is priced under $200 in OEM quantities.

The units contain the 8085 processor, whose typical instruction execution time is 2 microsec and can operate as self-contained computers, the firm said.

80P05 Package

Intel's 80P05 prototyping package contains the 80/05 and hardware and software necessary to construct and evaluate OEM processing and control systems with either SBC, the firm added.

In addition, Intel introduced the SDK-85 system design kit, a design and evaluation system for microcomputers based on the 8085.

The kit contains all components necessary to construct an MCS-85 system, including CPU, memory and I/O, the firm said.

Monitor Software

It also includes system monitor software in read-only memory (ROM), an interactive keyboard display and a design library, the firm said.

The kit costs $250 in single-unit quantities and is available through Intel's distributors, the firm said.

In the 80/20-4, Intel has doubled the resident memory on an SBC 80/20, which is based on the 8080A.

4K-bit RAMs

The unit uses 4K-bit static random-access memories (RAMs) and can store up to 4K bytes of data on the RAMs and 8K bytes of program in optional erasable programmable read-only memories (Eproms) or masked ROMs, which are now 16K-bit devices.

The SBC 80/20-4 costs $995 and the standard SBC 80/20 costs $895 in single-unit quantities from the firm at 3065 Bowers Ave., Santa Clara, Calif. 95051.

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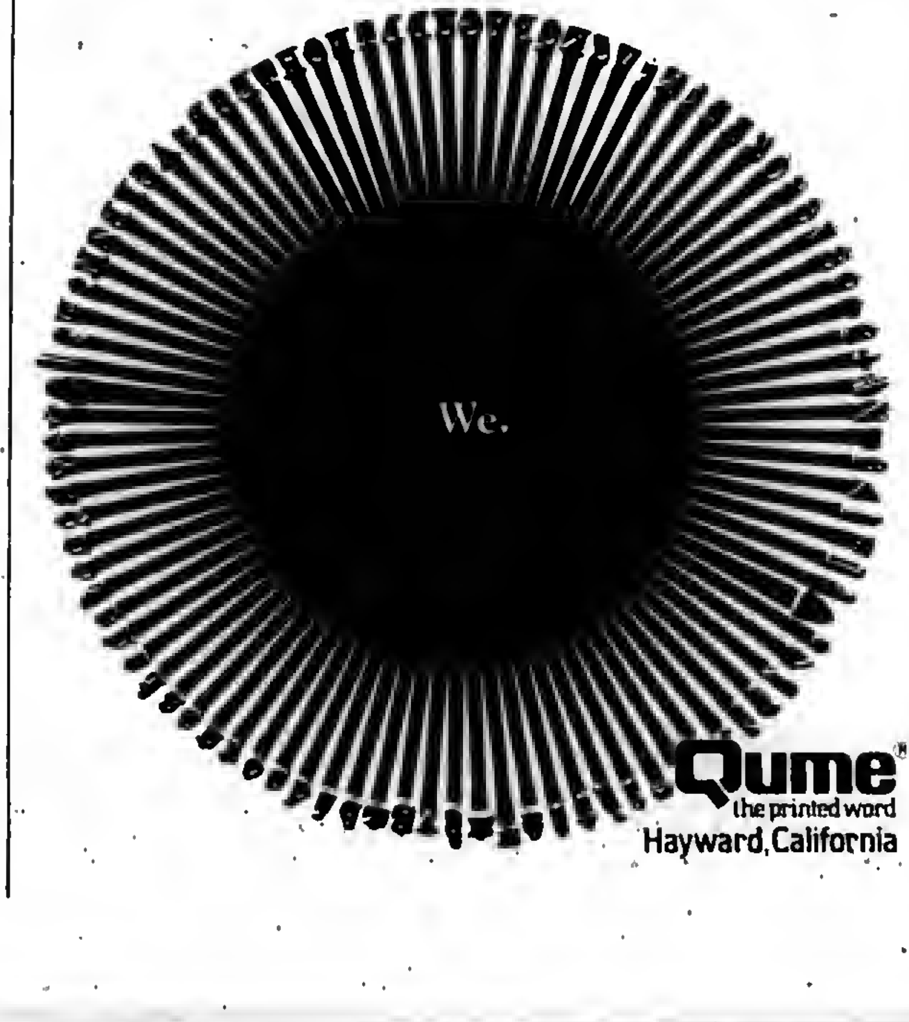

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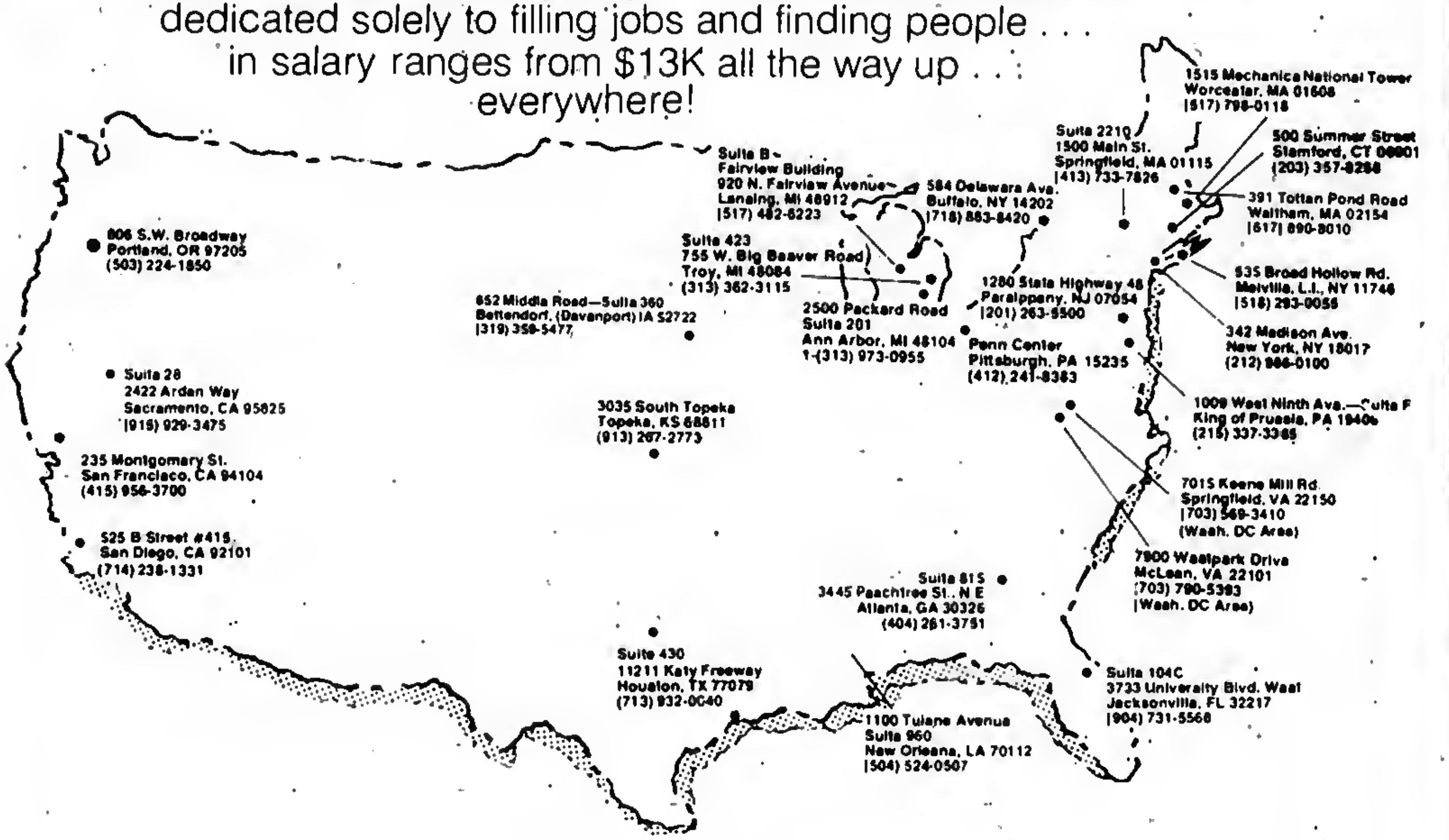
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Our Systems Architecture group seeks talented professionals to help design future high-performance computer systems. You should have a broad educational background in EE or CS with emphasis on computer architecture or design and be familiar with most of these areas: computer systems organization; storage systems organization; operating systems theory; assembler/high-level languages; data base fundamentals. Combined hardware and software experience and familiarity with system 370 is desirable. The following positions represent some of our more immediate needs; perhaps one of them is a good reason for you to make a move to Amdahl.

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You will be a key decision maker on an architectural team. You have experience in either computer systems or operating systems architecture or design.

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You will be a member of an architecture team working on diverse investigations. This position offers tremendous educational and advancement opportunities. You have at least 2 years' related experience or the equivalent.

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You will be responsible for research of computer system workload classification and analysis, including workload creation and synthesis. Research ability in the areas of performance measurement and evaluation is necessary.

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EOE M/F

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Send resume to Marcel Just, Psychology Department, Carnegie-Mellon University, Pittsburgh, Pa. 15213, or call (412) 621-2600, Ext. 483.

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If you are interested in exploring these exciting career opportunities, send your resume and salary requirements to:

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CPU Process Engineering

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SENIOR TEST ENGINEER
CPU Test Process Engineering

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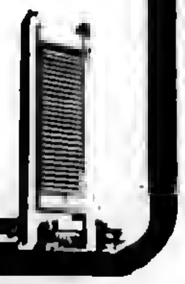

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FINAL FILING DATE: August 12, 1977

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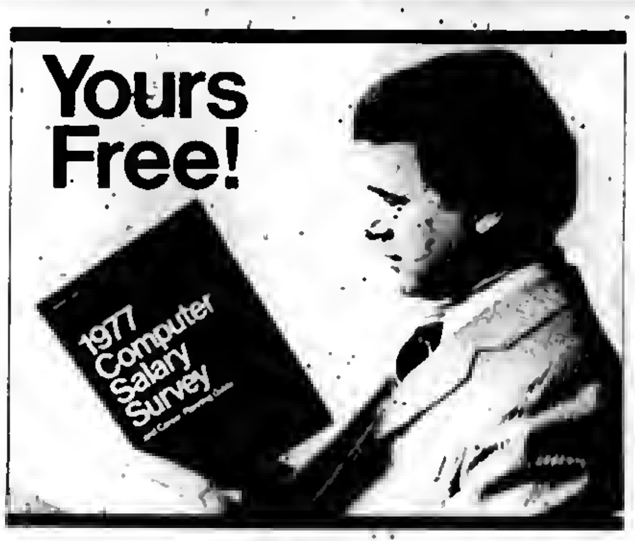

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We have openings throughout the United States for top closers with a minimum of 3 years experience in the real-time, Data Base, Data Communications and Distributed Processing marketplace. You should have a strong technical command of both hardware AND software, and a successful track record in the minicomputer industry.

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Sperry Univac field analysts have a key responsibility in marketing headquarters interface and sales/proposal preparation and service support. A technical degree is desirable, but creative, problem solvers are a greater asset to our sales force. A minimum of 3 years pre and/or post sales support in real-time commercial (Data Base, Data Communications, Distributed Processing) and/or real-time scientific applications is required.

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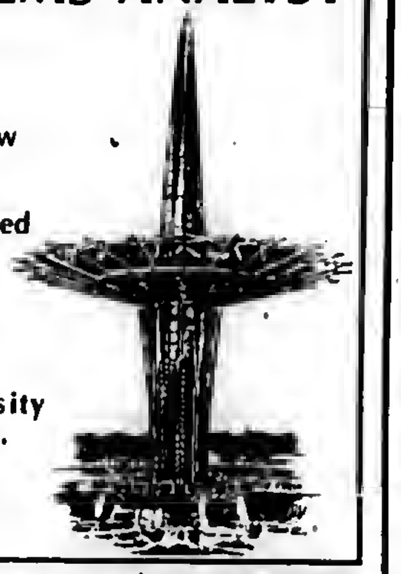

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Teleprocessing**

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Should have a minimum of 2 years experience in business applications using COBOL or ASSEMBLER on Univac Equipment.

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Please send resume, including salary requirements and references to:

**D.J. Spapperl
Manager, Systems Development
Information Systems Division, 10MW
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111 North State Street
Chicago, Illinois 60690**

Director of Corporate Systems

Booz Allen & Hamilton continues its growth in the management consulting industry. Our rapid expansion has created an opening in our Corporate Internal Financial Group, located in north central New Jersey, for a Computer Systems Professional interested in enhancing our development through the conceptualization and introduction of a centralized corporate systems capability.

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REQUIREMENTS: A master's degree, a minimum of six years experience in systems analysis and programming with at least two years in a supervisory position, and at least two years experience working with college or university administrative information systems. Significant experience beyond the minimum requirements may be substituted for the graduate degree.

SALARY: $15,100-$22,650 plus liberal employee benefits. Starting salary dependent upon experience and qualifications. Interested persons should submit resume by August 24, 1977 to: Marc M. Solomon, Oberlin College, Computing Center, Oberlin, Ohio, 44074. This position is to be filled by October 14, 1977 with the person reporting to work no later than November 14, 1977. *Affirmative Action (M/F) Equal Opportunity Employer.*

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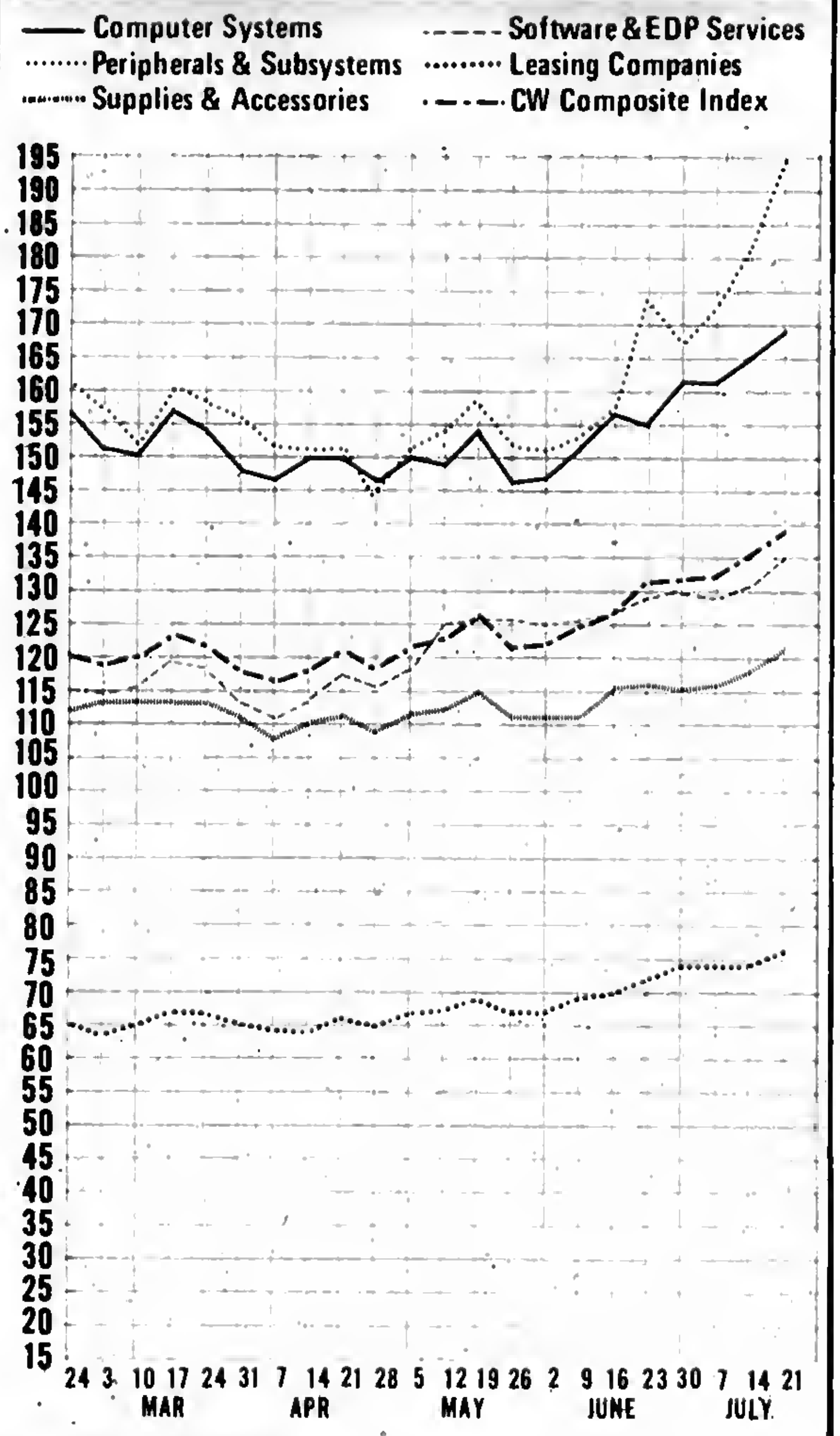

Earnings Reports

SANDERS ASSOCIATES
Three Months Ended April 29

	1977	1979
Shr Ernd	$.19	$.25
Revenue	36,914,000	41,925,000
Disc Op	1,466,000	(840,000)
Tax Cred	.....	411,000
Earnings	3,257,000	1,134,000
9 Mo Shr	.....	.79
Revenue	109,194,000	129,541,000
Disc Op	(14,029,000)	(2,740,000)
Tax Cred	.....	1,141,000
Earnings	(8,619,000)	3,597,000

TALLY
Three Months Ended April 3

	1977	1979
Shr Ernd	$.21	$.19
Revenue	8,433,000	9,112,000
Tax Cred	192,000	379,000
Earnings	699,000	658,000

UNITRODE
Three Months Ended April 30

	1977	1976
Shr Ernd	$.26	$.20
Revenue	9,506,009	7,313,120
Earnings	653,739	492,339

WABASH
Year Ended December 31

	1876	1875
Shr Ernd	$1.61	$.90
Revenue	53,052,945	33,016,179
Disc Op	.....	31,993
Earnings	3,055,032	1,329,812
3 Mo Shr	.96	.43
Revenue	22,319,958	9,642,109
Disc Op	.....	31,993
Earnings	1,126,710	705,269

WALLACE BUSINESS FORMS
Three Months Ended April 31

	e1977	1976
Shr Ernd	$.95	$.60
Revenue	20,717,000	17,712,000
Earnings	1,323,000	1,177,000
9 Mo Shr	1.90	1.95
Revenue	60,719,000	55,293,000
Earnings	3,643,000	3,632,000

e-Includes results of Delamark, Inc., acquired in November 1976.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 20, 1977

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 20 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	AMDAHL CORP	0- 39	32 1/4	+2	+6.6
N	BURROUGHS CORP	55- 91	68 5/8	+6 1/8	+9.7
C	COMPUTER AUTOMATION	18- 28	26 3/4	+ 1/4	+0.9
N	CONTROL DATA CORP	20- 26	22 5/8	+1 5/8	+7.7
N	DATA GENERAL CORP	35- 50	49 1/2	+4 3/4	+10.6
N	DATAPOINT CORP	18- 30	27 3/8	+ 1/2	+1.8
N	DIGITAL EQUIPMENT	37- 53	48 3/4	+2 3/4	+5.9
N	ELECTRONIC ASSOC.	2- 3	2	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	8 3/4	- 3/8	-4.1
O	FOUR-PHASE SYSTEMS	13- 17	15 1/4	0	0.0
N	FOXBORO	42- 54	47 1/2	+ 1/9	+0.2
O	GENERAL AUTOMATION	6- 9	7 3/8	- 1/4	-3.2
C	GRI COMPUTER CORP	1- 1	1/2	- 1/8	-20.3
N	HEWLETT-PACKARD CO	69- 87	82 1/4	+2	+2.4
N	HONEYWELL INC	44- 55	53 5/8	- 3/4	-1.3
N	IBM	245-286	273	+11 7/8	+4.5
O	MANAGEMENT ASSIST	5- 9	6 3/4	+ 3/8	+5.8
C	MEMOREX	23- 29	28	+2 1/8	+9.2
C	MICRODATA CORP	7- 18	9 1/8	0	0.0
U	MODULAR COMPUTER SYS	5- 8	7 7/8	+ 1/8	+1.6
N	NCR	32- 42	42	+5 1/8	+13.8
O	PRIME COMPUTER INC	12- 18	17 3/8	+ 1/8	+0.7
N	PERKIN-ELMER	17- 22	21 1/8	+ 1/2	+2.4
N	RAYTHEON CO	16- 33	31 1/2	+1 5/8	+5.4
N	SPERRY RAND	34- 42	37 1/2	+2 1/4	+6.3
O	SYCOR INC	8- 15	9 7/8	- 5/8	-5.9
A	SYSTEMS ENG. LABS	5- 8	8 1/8	+ 7/8	+12.0
N	VARIAN ASSOCIATES	15- 21	19 1/8	+ 1/8	+0.6
A	WANG LABS.	14- 20	19 7/8	+ 7/8	+4.6

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 20 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	10 1/8	+ 1/2	+5.1
O	COMDISCO INC	10- 13	10 1/4	- 1/4	-2.3
A	COMMERCE GROUP CORP	2- 2	2	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	-	-6.7
M	DATRONIC RENTAL	1- 2	1 1/8	+ 1/8	+12.5
A	DCL INC	1- 2	2	0	0.0
N	DPF INC	6- 9	8 5/8	+ 5/8	+7.8
N	ITEL	13- 20	19 5/8	- 1/8	-0.6
N	LEASCO CORP	19- 25	24 7/8	+ 1/8	+0.5
O	LEASPAC CORP	1- 2	1	- 1/2	-33.3
O	NRG INC	0- 0	1/4	+ 1/8	+100.0
A	PIONEER TEX CORP	5- 11	6	+ 1/4	+4.3
N	U.S. LEASING	10- 15	14 3/4	+1	+7.2

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 20 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1	0	0.0
O	ANACOMP INC	7- 9	9 1/4	+ 3/9	+4.2
A	APPLIED DATA RES.	5- 10	9 1/2	+ 5/8	+7.0
N	AUTOMATIC DATA PROC	23- 30	29	+ 7/8	+3.1
O	COLEMAN AMERICAN COS	2- 2	2	+ 1/4	+14.2
O	COMPU-SERV NETWORK	10- 15	11 1/2	- 1/2	-4.1
O	COMP ELECTION SYSTMS	6- 9	9 1/4	0	0.0
C	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	6 1/8	- 1/4	-3.9
N	COMPUTER SCIENCES	7- 9	8 3/8	+ 1/4	+3.0
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMSHARE	5- 7	6 1/2	- 1/4	-3.7
O	DATA DIMENSIONS INC	4- 5	3 1/2	0	0.0
O	DATATAB	1- 2	1 7/8	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	18 7/8	- 3/8	-1.9
O	INSYTE CORP	2- 3	1 7/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	4 7/8	+1 3/8	+39.2
C	KEYDATA CORP	2- 3	1 3/4	- 1/8	-6.6
A	LOGICON	7- 17	13 7/8	-2 1/8	-13.2
A	MANAGEMENT DATA	1- 2	1 5/8	+ 1/8	+8.3
A	NATIONAL CSS INC	19- 25	23 7/8	+ 1/2	+2.1
O	NATIONAL DATA CORP	4- 7	6 1/8	0	0.0
A	ON LINE SYSTEMS INC	17- 22	19 1/4	+ 7/8	+4.7
N	PLANNING RESEARCH	3- 5	5	+ 1/2	+11.1
O	PROGRAMMING & SYS	1- 1	5/8	+ 1/8	+25.0
O	RAPIDATA INC	2- 3	2 3/4	+ 1/4	+10.0
O	REYNOLDS & REYNOLDS	17- 20	19 3/4	+ 1/4	+1.2
O	SCIENTIFIC COMPUTERS	1- 3	3 1/8	0	0.0
O	TYMSHARE INC	14- 23	21 1/2	+ 1/4	+1.1
A	URS SYSTEMS	4- 5	4 1/4	- 1/4	-5.5
N	WYLY CORP	1- 2	1 3/8	+ 1/8	+10.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 20 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	14 1/4	+ 1/2	+3.6
O	ADVANCED MEMORY SYS	7- 9	8 1/8	- 1/4	-2.9
N	AMPEX CORP	8- 11	11	+ 1/8	+1.1
O	ANDERSON JACOBSON	3- 5	4 1/4	- 1/4	-5.5
N	APPLIED DIG DATA SYS	10- 16	14 7/8	+ 1/4	+1.7
O	BEEHIVE INT'L	8- 12	9 5/8	+ 1/8	+1.3
A	BOLT,BERANEK & NEW	7- 8	7 1/4	+ 5/8	+9.4
N	BUNKER-RAMO	8- 12	10 3/4	+ 1/4	+2.3
A	CALCOMP	3- 5	3	0	0.0
O	CAMBRIDGE MEMORIES	1- 3	2 3/4	+	+2.2
N	CENTRONICS DATA COMP	22- 29	28 5/8	+2 1/8	+8.0
O	COGNITRONICS	1- 1	1/2	0	0.0
O	COMPUTER COMMUN.	5- 6	6 5/8	+ 1/4	+3.9
O	COMPUTER CONSOLES	4- 7	4 3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3	+ 1/8	+4.3
O	COMPUTER TRANSCEIVER	1- 1	1	0	0.0
O	COMTEN	9- 13	10 7/8	- 1/2	-4.3
N	CONRAC CORP	19- 28	22 3/8	-1 3/8	-5.7
O	DATA ACCESS SYSTEMS	4- 5	4	0	0.0
O	DATA 100	6- 9	8 1/2	+ 3/4	+9.6
A	DATA PRODUCTS CORP	9- 15	14 3/4	+ 3/8	+2.6
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUM INC	1- 2	1 3/4	+ 1/4	+16.6
O	DECISION DATA COMPUT	2- 3	2 1/2	- 1/8	-4.7
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	4	- 1/8	-3.0
O	FABRI-TEK	1- 2	1 1/4	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	10 1/8	+ 1/8	+1.2
N	HARRIS CORP	28- 39	36 1/8	- 3/4	-2.0
A	INCOTERM CORP	11- 15	11 1/8	+ 1/4	+2.2
O	INFOREX INC	4- 7	5 1/8	- 1/4	-4.6
C	INFORMATION INTL INC	9- 14	10	- 1/4	-2.4
O	INTEL CORP	38- 57	51	+2 1/2	+5.1
A	LUNDY ELECTRONICS	3- 6	5 5/8	+ 1/4	+4.6
O	MSI DATA CORP	6- 10	9 1/2	+ 3/8	+4.1
N	MOHAWK DATA SCI	5- 8	5 3/4	+ 7/8	+17.9
O	PENRIL CORP	2- 5	4 1/2	0	0.0
A	PERTEC CORP	7- 9	8 3/8	+ 3/4	+9.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	4	+ 1/8	+3.2
O	RECOGNITION EQUIP	6- 10	8 7/8	- 1/8	-1.3
O	SCAN DATA	1- 2	1 1/2	0	0.0
O	STORAGE TECHNOLOGY	10- 15	13 1/4	- 1/8	-0.9
O	T BAR INC	7- 12	12	+ 3/8	+3.2
O	TALLY CORP.	4- 6	3 3/4	- 1/4	-6.2
A	TEC INC	7- 10	8 1/4	- 1/8	-1.4
N	TEKTRONIX INC	29- 37	36 1/2	+2 3/8	+6.9
N	TELEX	2- 3	3	+ 3/8	+14.2
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 20 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 3/4	0	0.0
A	BARRY WRIGHT	10- 14	14 1/4	+ 1/2	+3.6
O	CYBERMATICS INC	1- 1	5/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	18 1/2	+1	+5.7
N	ENNIS BUS. FORMS	6- 7	6 3/8	+ 1/8	+2.0
O	GRAHAM MAGNETICS	11- 15	14 1/4	- 1/2	-3.3
O	GRAPHIC CONTROLS	15- 18	17	+ 3/4	+4.6
N	3M COMPANY	48- 56	49 7/8	+1 1/4	+2.5
C	MOORE CORP LTD	27- 37	27 3/4	+ 3/4	+2.7
N	NASHUA CORP	16- 25	24	- 5/8	-2.5
O	STANDARD REGISTER	18- 25	23	0	0.0
O	TAB PRODUCTS CO	13- 19	18 1/2	+2 1/2	+15.6
N	UARCO	19- 22	21 3/4	+ 3/4	+3.5
A	WABASH MAGNETICS	10- 15	13 7/8	0	0.0
N	WALLACE BUS FORMS	17- 21	19 1/2	+1	+5.4

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Wide World Photo

DPressing!

Johnstown, Pa., flood victims are just beginning to dig themselves out from under the sludge left by a flood which hit nearly two weeks ago. Most DP installations still don't know the extent of their damage. See story on Page 2.

With Zero-Base Budgeting

Carter May End 'Closet' DP Funds

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's plan to institute zero-base budgeting throughout the federal government will help end agencies' use of their DP budgets as "closets" in which to hide an extra million dollars or so, representatives of Arthur Young and Co. told a users group meeting here recently.

Zero-base budgeting — or ZBB — will pinpoint actual DP costs early in the budget process through which federal agencies must go, Charles B. Sheridan, a manager with Arthur Young, explained to the Federal ADP Users Group's (Fadpug) special interest group on ZBB and automated DP (ADP).

Like the rest of its agency, a federal DP installation must use this latest budget preparation technique to determine the lowest level of funding at which it can continue to deliver its program and services, Gerald Mendenhall of Arthur Young noted.

Full DP Evaluation

Under ZBB, all DP and other agency activities must be fully evaluated. The process works under the assumption that current operations are not necessarily essential and cost-effective, Mendenhall said.

Agencies must now do what many businesses are already doing: conduct systematic reviews of all their programs and services and rank them according to their importance and value to the organization's overall purpose, he stated.

Agency budget requests must now begin with necessities, move through "wants" and end with "wishes," Mendenhall suggested.

The Arthur Young executives predicted the first year of ZBB will be hardest on federal DP installations, not only because they must use the budget process to make their own funding requests, but they must also help the rest of their agencies understand and employ ZBB.

Sheridan showed 42 attendees at the meeting how one of Arthur Young's commercial clients used ZBB to distinguish between the levels of developmental programming and computer operations that were necessary to the organization's operation and those they had hopes of developing.

For example, in computer operations the organization began by noting that its current funding was $1.762 million. It projected a budget for the next year of $1.706 million, Sheridan said.

For this organization, the bare minimum of computer operation required was to keep its two IBM 370/155s up and running. For an additional $54,000, the DP manager said he would be able to increase the memory capacity on the 155s to a level sufficient to permit the development of interactive capability.

A third level with an additional sum of money would enable the organization to acquire a 370/138 that could be dedicated to interactive programming development.

In addition to employing ZBB to come up with its own budget, a federal DP installation must provide its agency's budget office with simulation capability to perform "what-if analyses" and cost-benefit studies, Sheridan said.

Agency line managers should be able to look to the DP organization for the capability of manipulating and ranking the levels of resources for which they are requesting funds. Ideally, managers should be able to use this DP service in an interactive mode,

(Continued on Page 6)

CRTs Cause of Editors' Cataracts?

By Nancy French
And John P. Hebert
CW Staff

NEW YORK — Two copy editors who work for *The New York Times* were diagnosed as having cataracts after the newspaper switched to electronic editing and typesetting — a change that put the two in front of CRTs all day.

Both editors, who are in their 30s, suspect radiation emitted from the CRTs is to blame.

Cataract victims average 60 years of age, according to Dr. Edward Murphy Jr., a Boston opthalmologist affiliated with the Massachusetts Eye and Ear Infirmary who also teaches at Harvard Medical School.

The disease, which clouds the normally transparent lens of the eye and eventually causes blindness, can be corrected surgically by removing the lens and then adjusting vision with contact lenses and/or thick glasses.

Murphy said the disease is so unusual in people as young as 30 or 35 that when he finds such a case he usually looks for "some systemic disease such as diabetes."

Dr. Milton Zaret of Scarsdale, N.Y., an ophthalmologist and authority on the effects of radiation on the eye, said radiation could be to blame. Zaret was called in on the case after the Newspaper Guild of New York AFL-CIO intervened on behalf of the two copy editors.

At first *The Times* took the position that there was no connection between

(Continued on Page 2)

Mass. Probing Pact Awards With Big Stakes

By Don Leavitt
CW Staff

BOSTON — Several investigations are probing the propriety of two major DP contracts let by the Commonwealth of Massachusetts since the beginning of the year.

The political stakes are enormous.

One of the contracts involves the reorganization and operation of much of the state's DP work, under a five-year facilities management arrangement, for a greatly expanded Department of Administration and Finance (A&F).

(Continued on Page 6)

We've Upgraded, Too

If you think *Computerworld* looks different, that's because it is. We have entered the age of computerized typesetting.

The entire paper has been redesigned to make it easier to read — new typefaces are used throughout, both in the regular body copy and in the headlines. All the sections now have distinctive "banners" to make them more identifiable.

In addition, a new section has been added to the paper. The new section on Microcomputing (See Page 37) will add coverage of the rapidly changing area of microcomputer use in both the hobby and small business areas to our regular sections.

The new type and headlines are made possible through the use of a computer-based composing system and a phototypesetter. The Quadex Corp. Typographer 2 linked to a Dymo Pacesetter replaces IBM MT/STs which we have rented — believe it or not — for 10 years.

The use of computers by a computer publication is nothing startling, but it certainly has given us some additional insight into the problems faced by users every day.

And even though the installation will give us a fund of "horror stories" to trade with users from now on, we hope the new look it gives *Computerworld* will increase your reading pleasure.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Salvage Attempts Under Way

Johnstown DP Loss Still Unknown

By Ann Dooley
CW Staff

JOHNSTOWN, Pa. — Rescue workers here are struggling to determine the extent of damage to computer equipment and installations in this area, which was hit by a surprise downpour and subsequent flood nearly two weeks ago.

Still hampered by virtually nonexistent communications, mountains of sludge and up to eight feet of water in some areas, service is almost at a standstill.

"We're trying to find out what condition the equipment is in, but some of the [installations] don't even exist anymore," an IBM spokeswoman said.

The flood, the second in the city's history, occurred after 10 inches of rain fell in seven hours, causing the Connemaugh River to overflow.

The day after the flood, an IBM emergency team was set up to try to locate and salvage as much equipment as possible. IBM field managers flew over the area to see what parts of the town sustained the most damage and to determine which customers would need the most help, the spokeswoman said.

The team found three IBM System 32s and one System 3/15B, but all appeared beyond repair, according to the spokeswoman. Two IBM mainframes known to be in Johnstown have not yet been accounted for and, because of the lack of communications, it is impossible to determine the number or condition of those affected in the outlying areas, she said.

Of the four computers that were submerged, all were housed on the first floor or in the basement, the spokeswoman said.

Hampered by Explosion

The rescue workers were making some progress until a gas explosion in a glass factory occurred, causing much of the town to be evacuated, the spokeswoman said.

Crown America, a distribution company here, was one of the few places the IBM rescue team could reach. Crown's System 3/15B was reported unsalvageable, but three data modules on which all customer information was stored have been saved.

The modules, stored in a safe believed to be airtight and waterproof, were soaked by the flood waters but IBM flew them to a center in San Jose, Calif., and 99% of the data was restored, the spokeswoman said.

IBM has leased a warehouse in the area and is sending emergency supplies of floppy disks and other equipment.

Other Vendors' Efforts

NCR Corp. is also organizing an emergency team, but since a written order is needed to enter Johnstown, which is now under martial law, the team has been unable to reach any customers, a spokesman said.

The NCR branch operations facility itself is reported to be under eight feet of water, although no computer equipment is in jeopardy. Many of the NCR installations in the area house their computers on second and third floors and should be out of danger, an NCR spokesman said.

Honeywell Corp. reported that none of its users' installations were affected because most were located on upper floors.

No one could estimate how much damage to computers and equipment has occurred, but the American Insurance Association has said that insured losses could exceed $42.5 million.

Cataracts Caused by CRTs?

(Continued from Page 1)

use of the CRTs and the two cataract diagnoses and that the men probably had cataracts before they began working on the CRTs. But 50 copy editors at *The Times* weren't so sure.

These editors signed a petition asking for an inquiry.

The Newspaper Guild asked the Manhattan Federal District Court to grant a temporary restraining order to take the two editors off the CRTs until new tests could be done.

Judge Thomas P. Griesa ruled the dispute should be settled through arbitration. A panel was selected and at the moment a representative sample of the machines in use at the newspaper is being tested for radiation "by an independent party," according to Harry Fisdell, vice-president of the guild.

Research done to date on the cataract-radiation problem is inconclusive. A study released May 13 by the National Institute of Occupational Safety and Health (Niosh) of Cincinnati stated that CRTs do not emit enough nonionizing radiation to pose an occupational hazard.

The study did acknowledge both copy editors have the type of cataracts "compatible with those reported from exposure to radiant energy."

However, the Niosh report has "fatal flaws," according to Zaret. Further, neither of the two men has "any significant medical history that would lead to the development of cataracts," he said.

Zaret, who has spent 20 years studying the effects of radiation on the eye, said the problems with color TV sets — which also contain cathode ray tubes — have been resolved, but CRT terminals are a "totally unexplored area."

"Deflection coils" which deflect the electronic beam onto the screen "create electromagnetic radiation as well as nonionizing radiation." These could produce cataracts, he said.

The terminals in use at *The Times* are largely Harris Corp. H-1520 CRTs, which create characters using a dot-matrix display, according to Gordon Kilgore, program manager for Harris' Composition Systems Division.

Nearly 1,000 of these terminals are now in use all over the world, Kilgore said, and no problems like this have ever been reported before.

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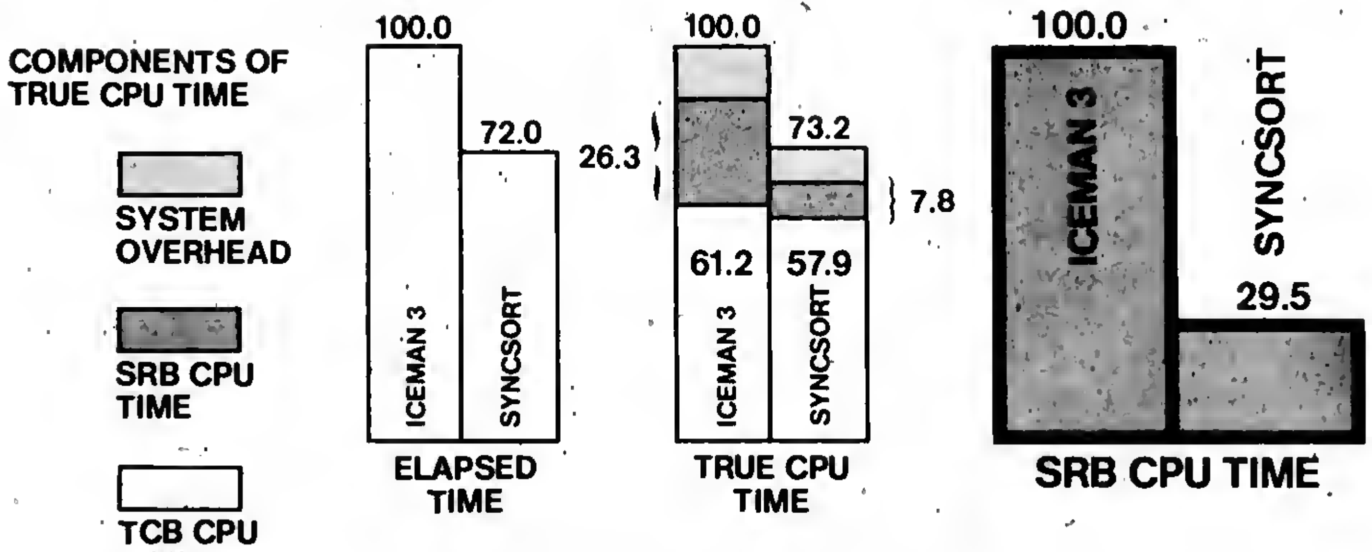
Take the incident that occurred a few weeks ago in a data-processing center that Must Remain Nameless.

In came a very nice, very upstanding IBM representative. His intent was to prove, once and for all, that IBM's new SM1-5740, Release 3, was superior to Whitlow's Sync-Sort III-and-a-half.

As the sun sank slowly in the west, the IBMer rolled up his sleeves and set to work. Benchmark followed benchmark. Hours passed. Results began to emerge. Inevitably, they looked like this:



By the time the poor fellow departed the premises, looking a bit crestfallen, even he was admitting that SyncSort was probably the data-processor's best bet.

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Milan: SYNTTAX
Paris: CAP/SOGETI PRODUITS
Sao Paulo: Deltacom do Brasil
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Report Indicates Congress Erred

GAO Urges Study of Alternatives to 'Target'

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The final version of a General Accounting Office (GAO) report on the Veterans Administration's (VA) proposed Target system suggests Congress erred in its recent decision to fund the controversial computerized claims-processing system for 1978.

After the House and Senate couldn't agree on the project, a conference committee meeting earmarked $18.4 million for the system for fiscal year 1978, even though committee members had in their hands the draft of the GAO report, which called the system "still a risky venture [CW, July 25].

"The costs and benefits of the proposed system and alternatives to it were not thoroughly evaluated. They should be," according to the final, "restricted" GAO report dated July 29, which was obtained here last week by *Computerworld.*

The GAO recommended Congress not permit the VA to award a contract for the $100.9 million system, which would cost an additional $12.5 million to operate each year, until the VA has set up measurable goals and standards for improving benefit claims services to veterans.

"Proponents of the Target system argue that the present benefit claims system is inefficient and that service to veterans is suffering," the GAO report noted. "Yet, VA had not established measurable goals or standards for improved service.

"In other words, VA had no basis for comparing alternative approaches and for determining whether systems less complex and less expensive than Target could do the job," the GAO concluded.

In fact, the administration proceeded with the development of Target without any economic analyses of alternative ways of meeting its benefit claims-processing needs, the report said.

Cost-Benefit Analyses

Major cost savings are possible with Target, but equally realistic are cost projections which exceed the system's monetary benefits when compared with the VA's current benefit claims-processing methods, the GAO study stated. The venture is thus "risky," Congress was told.

Even if the VA developed the necessary goals and standards for improved benefit service to veterans, as the GAO recommended, Congress should continue to hold up any contract award for Target until the VA produces a "definitive and complete" implementation plan for the system, the GAO said. That plan should resolve current uncertainties about the progress of development on Target, the costs involved and the implementation schedule for the system, the report added.

Cleland's Comments

The 75-page GAO report included comments by VA administrator Max Cleland, who agreed that measurable goals and standards for improving service to veterans are needed, but believes "the outstanding questions [concerning Target] have been satisfactorily resolved" and "the VA should proceed immediately with the necessary steps to make the Target system a reality at the earliest possible date."

Cleland stated that since he became VA administrator on March 2, he has given "top priority" to a thorough study and analysis of Target by himself and key VA officials.

He pledged the VA "will identify goals, objectives and performance standards for the Target system which will be quantified before installation, against which the system benefit improvements will be evaluated."

The GAO stated its belief that such measurements will need to be made in order to assess Target's success if it is implemented, but added this is not the action it had recommended. What GAO suggested was that the VA "establish, in measurable terms, goals and standards for improving benefit claims services to veterans *before* it can adequately determine what type of system it needs to meet those goals and standards at the least cost," the GAO report explained.

Cleland further contended that the revised system implementation schedule presented to the GAO and to Congress can be achieved with "very low risk of disrupted service to the veteran population" and that VA's analysis of the schedule "demonstrates conclusively that Target will be cost-beneficial."

The GAO, however, does not agree with Cleland's assertion that the revised schedule and related cost-benefit analysis resolve any of the uncertainties cited in its report about the progress of VA's development, its costs or its implementation.

The GAO inquiry into the cost-benefit justification of Target was originally requested by Representatives John E. Moss (D-Calif.) and Charles Rose (D-N.C.) in December 1975.

DPMA Fighting Software Tax

CHICAGO — The Data Processing Management Association (DPMA) has joined the battle against taxation of software and services now being waged in half a dozen states by pledging $1,400 to fund efforts in New York and Tennessee.

The results of those efforts will determine future action in other states where software and/or services are taxed, such as California and Wisconsin, according to George Eggert, head of the DPMA's Industry and Government Relations Committee.

The DPMA has retained Robert M. Sherin, president of Nova Computing Services, Inc. of Miami, to argue its case in an open hearing with New York State Tax Commissioner Thomas H. Lynch on Aug. 23.

The organization seeks to exempt software, services and telecommunications from taxation.

Seeking Funds

Eggert plans to issue a broad appeal for funds to finance the fight against software taxation; his proposal is currently under review of DPMA's legal staff, he indicated.

If the DPMA's involvement reaches the point of judicial action, Eggert said it must go back to the drawing board because Sherin is not an attorney. Hopefully there will be money in the fund to finance such action, he added.

Eggert called the DPMA the logical vehicle to wage the fight against software taxation, but admitted the group lost some momentum because it has "dragged its feet" since it first expressed interest in the issue [CW, May 16]. However, Eggert expects the movement will pick up.

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UPC-Based Store Ordered to Price-Mark Items

By Ronald A. Frank
CW Staff

SALEM, Mass. — An automated supermarket checkout system has become the subject of a legal suit between the Massachusetts Attorney General's Consumer Protection Division and Purity Supreme, Inc. here.

The IBM 3660 supermarket system was installed by Purity Supreme in its Heartland warehouse store as part of a full scanning checkout system using the Universal Product Code (UPC).

The UPC is used with scanners at checkout terminals so bar-coded labels on grocery items automatically trigger a price lookup operation in a store's processor. When identifying data about an item is transmitted to a price data base in the computer, the price is displayed at the checkout terminal and printed on the customer's receipt tape.

In keeping with its warehouse image, the low-cost supermarket uses price marking only on shelves, not on individual items. The store gives customers grease pencils to mark items purchased if they feel prices are needed.

However, the consumer office of the Massachusetts Attorney General's office stepped in to require that Purity Supreme mark the price on each item in compliance with a state regulation that requires each item of food in a store to have a price on it.

Purity Supreme then filed a countermotion seeking to bar the state from enforcing the regulation. After hearing arguments by both sides in Middlesex Superior Court, Judge Alan Dimond last week issued a preliminary injunction against the supermarket chain, requiring that all items be price marked.

The Salem Heartland store has 12 automated checkout terminals; it stocks 2,500 items according to Timothy Goodburn, computer operations manager at Purity Supreme. The IBM 3660 has been operational since March.

Commenting on the possible abuses of such a system, Assistant Attorney General Paula Gold said "the real danger is that it is so much easier to change prices with a computerized checkout system. It is also easier just to increase prices because you don't have to reprice the item on the shelf."

According to figures from the supermarket chain, the annual cost to a customer to price each item is about $7 per year, and this is the minimal amount that the user will pay for having the prices, Gold said.

As soon as Judge Dimond issued his order in the case, the Consumer Protection Division planned to send someone to the Heartland store "to make sure they have actually put the prices on," she said. "I have every reason to believe that they will comply."

The next step in the legal proceeding is up to the company, according to Gold, and it has two options — to appeal the judge's ruling or to ask a trial on the merits of the case.

Purity Supreme officials said any comment would have to come from Leo Kahn, president, but Kahn could not be reached.

Most Customers Happy

Rudolph Kass, attorney for Purity Supreme, said the order to price mark items "is only a preliminary round. Of course we are disappointed and of course we will comply with the order of the court pending further proceedings."

Dimond's decision "was not a decision on the merits of the case" and Purity Supreme intends to pursue the issue on two fronts. First, it will proceed with the litigation; secondly, it will proceed with "administrative steps" to try to get changes in the state regulation, Kass said.

The company conducted a survey at the Salem store, he noted, and 96% of the customers "are pleased wth the system." Four percent said they would like to have items marketd.

Gold said she was not sure whether the initial complaint about a lack of prices at the Heartland store had come from a disgruntled shopper. But the Consumer Protection Division will enforce the state pricing regulation whenever a store is found eliminating item price marking, she said.

Kreps Defends Carter OTP Plan

WASHINGTON, D.C. — Secretary of Commerce Juanita Kreps has defended President Carter's move to reorganize the Office of Telecommunication Policy (OTP) and welcomed the opportunity to get into the national debate over communications policy.

"The reorganization plan calls for the appointment of an Assistant Secretary for Communications and Information, providing a clear indication of the significance that President Carter and I attach to communications issues," Kreps said in a recent statement here.

Many members of Congress criticized Carter's plan because they felt such a move will downgrade the OTP's visibililty [CW, July 25].

Under the President's plan, the Commerce Department will assume many of the functions previously performed by the OTP, Kreps said.

"We will be dealing with more than mere technical specifications and system configurations, we'll be addressing issues that will affect the ways people communicate and the matter in which the technology of communications is controlled," she stated.

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New Trial for Catamore

WASHINGTON, D.C. — Phase one of IBM vs. Catamore Enterprises, Inc. has ended with the case awaiting its second trial in Rhode Island after the U.S. Supreme Court refused to hear Catamore's appeal of a lower appeals court decision.

But nobody knows when the trial is likely to start because the Rhode Island court is functioning with only one judge whose time is consumed with criminal cases, sources said.

The First Circuit Court of Appeals in Boston last September overturned a jury decision awarding Catamore $11.4 million and ordered the case returned for a new trial [CW, Oct. 4].

Catamore fought this order through the appeals process all the way to the Supreme Court.

The case involved an unhappy user which contracted for a system prior to unbundling and which allegedly did not receive the software IBM had agreed to supply.

ZBB May End Closet Funds

(Continued from Page 1)

Sheridan noted.

Finally, the accounting department must be able to keep track of funds budgeted vs. those monies actually spent. Again, the DP operation can be expected to help, he said.

Many simulation packages are available commercially, and the Civil Service Commission has developed a prototype simulation package designed specifically for ZBB, Sheridan told his audience. He urged attendees to use mathematical models if they decide to develop their own simulation systems because these models can take into account changes in the economy and in legislation.

An agency's ZBB DP system should be driven by an accounting-budget base, Sheridan said. This base should contain a chart of accounts, an organization index, historical expenditure and budget records and current fiscal year accounting and budget data.

This accounting-budget base in turn will run a budget formulation process and a budget execution process.

Under the budget formulation process, the system will contain the simulation model, interactive programs for management inquiries, software that ranks services according to end product and programs for historical trend and possibly regression analysis.

The budget execution process will involve an appropriation accounting system, reporting on budgeted funds vs. monies actually spent, funding projections, costs to complete budget analysis, planning tools and answers to such management questions as "How am I doing?" and "How much money do I left?"

In persuading an agency's managers to use DP assistance in the ZBB process, DP installations need to keep the system simple.

They also need to use a minimum of codes and abbreviations. Where the system permits managers to interact with it, always provide prompting and don't let the system distract them from the budget process, Sheridan advised.

The special interest group on ZBB and ADP plans to hold further meetings, including a conference on this budgeting technique late this fall or early next spring, according to chairman Kendall E. Burroughs.

Open to organizations outside the government, the group was formed "to gather, develop and exchange information and guidelines for supporting ZBB with computer resources and applying ZBB techniques to ADP budgeting, Burroughs said.

Anyone interested in participating in this group can contact Burroughs at the U.S. Chamber of Commerce, 1615 H Street N.W., Washington, D.C. 20062.

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SDI Making Computers a Manageable Resource

Mass. Probing Big Awards; Conflict of Interest Charged

(Continued from Page 1)

When and if that contract goes into effect, it will be the most sweeping facilities management agreement let by any state, according to several observers.

The other pact covers the development of programs and the use of those programs to process Medicaid claims for the state.

The state Attorney General's Office is conducting one of the investigations at the request of A&F Secretary John R. Buckley. It was the selection process followed by Buckley's office, which made both awards, that gave each of them at least the appearance of a conflict of interest in violation of state law.

Both awards ultimately involved Electronic Data Systems, Inc. (EDS), even though the Dallas-based firm's bids were apparently not the lowest received in either case. Various other alleged irregularities further cloud the Medicaid award, which went to Blue Cross-Blue Shield of Massachusetts, with the processing subcontracted to EDS.

Other bidders on one or both of the contracts included Arthur D. Little, Inc. of Cambridge, Mass.; Booz, Alan & Hamilton of Washington, D.C.; and Computer Sciences Corp. of El Segundo, Calif.

The Governor's Advisory Committee on Computers and Data Processing is conducting its own probe of both situations. And the Massachusetts Legislature, which must appropriate funds before either contract can go into effect, is also becoming concerned about how the awards were made.

Overall, the probes are attempting to determine how real the alleged conflict of interest is, what can be done about it and how a repetition of the current confusion can be avoided in the future.

Contract Delays Blamed

The question of conflict of interest revolves around an almost unknown consulting firm, Sci-Tek Associates of Boston. Two members of the firm are members of Buckley's selection committee and voted to award the facilities management contract to EDS at the same time Sci-Tek was working with EDS on another business venture.

According to news reports, Robert Orr, one of the Sci-Tek men on the selection committee, left a meeting of that group — after voting for EDS — to fly to Memphis, Tenn., where he met with EDS officials to plan a combined proposal they were to present to that city.

Sci-Tek had sought the Memphis work on its own, but was told its proposal would be considered more favorably if it also involved another firm — EDS, for instance — with a more substantial reputation, the news reports said.

Defending his company's actions, Sci-Tek co-owner James Corkery contended it was delays in the Massachusetts contract selection process that created the appearance of the conflict of interest.

The process here was supposed to be finished in January, he said, while the Memphis contract didn't come up for consideration until early February.

The Massachusetts pacts involve high monetary as well as political stakes. The A&F facilities management agreement is worth $23.5 million; the Medicaid contract carries a $19.5 million price tag.

But the Medicaid contract has even higher potential benefits for Blue Cross-Blue Shield, according to one informed source. That insurance group hopes to become the "fiduciary intermediary" — the dispenser of funds — as well as the processor of claims for the system.

If that happens, "the Blues" could gain control of a half-billion dollar operation, he noted.

But that may be a way off, for there are still several issues to be resolved in addition to the possible conflict of interest. One of the losing bidders claimed, for example, that Blue Cross-Blue Shield had an exclusive opportunity to conduct an extensive study of the Medicaid system shortly before the state decided to put the work out for bid.

Specifically, Blue-Cross-Blue Sheild ran a study for the state in 1975. This resulted in the preparation of "eight or nine volumes, covering about three feet of shelf space," according to a person who was involved with the project.

Since this work was done under contract, the state considers these volumes to be proprietary and though "the Blues" have copies, none of the competing firms can see them, he added.

Language Difference

Another complaint lodged against the awarding of the Medicaid contract to Blue Cross-Blue Shield and EDS revolves around the bidder's intention to do the programming in BAL despite the request for proposal's call for the use of Cobol.

Cobol was specified because Medicaid is a federal program and both transportability and modification of programs nationwide would be simpler with a language that is common to various computers.

On the other hand, a former official of the state's Medicaid claims program argued that since Blue Cross-Blue Shield does "most of its work" in BAL, "it would be more convenient" for the company to do this work in that language, too.

George Schussel, a member of the Governor's Advisory Committee on Computers and Data Processing, argued that the language difference "would be significant in such a proposal. Perhaps not an overwhelming issue, but certainly an important point. It is not inconsequential."

'Waves' Not Ebbing

Waves of Change by Charles P. Lecht, which has been appearing in *Computerworld* in recent weeks, will be discontinued for the remainder of the summer.

The next chapter, which concerns minicomputers and microcomputers, will appear when the series resumes in September.

At Toronto Conference

Ifip President to Speak on DP Mart, Profession

TORONTO — Dr. Richard I. Tanaka, president of the International Federation for Information Processing (Ifip), will give a major address here as part of the organization's first North American conference since 1965.

In his presidential address, Tanaka will assess the present worldwide status of the information processing community with attention to professional issues as well as the burgeoning marketplace for computer products and services.

The address will be presented on Monday, Aug. 8, immediately following the opening keynote.

Dr. John E. Fobes, deputy director-general of the United Nations Educational, Scientific and Cultural Organization (Unesco) in Paris, will also participate in the president's session and express his views and perspectives on the international impact of computing.

According to Tanaka, Fobes' remarks should be particularly pertinent because Ifip's relationship with Unesco marked the first official ties established between Ifip and other international organizations.

Issues Complex

"The issues facing the international computing community are complex and we can expect them to become even more critical in the years ahead as the proliferation of computers and data communications networks becomes even more pervasive," Tanaka said.

"These issues touch upon many areas including computer science, technology, the expanding activities of multinational corporations and the emergence of international networks. The issues relate to national interests in both the developed and developing countries, as well as the need in many areas for a relatively 'open marketplace' in order to foster the continuing development of our technology and its application," he continued.

"The worldwide growth of the computing field shows little sign of tapering off to any significant extent. For example, the world revenues of U.S. computer manufacturing and service firms is estimated to have been $26.6 billion in 1976 and may well reach $51 billion by 1981. Present estimates show that U.S. computer manufacturers account for approximately 87% of the world's computers by value," he said.

Any company whose products are commercially sound enough to compete in the demanding U.S. marketplace should probably be doing at least half of its total business outside of the U.S. Where this is not the case, the company's management might be neglecting its opportunities, he added.

Tanaka has served as Ifip president for three years and is presently a consultant in the area of international marketing and management. He is a past president of the American Federation of Information Processing Societies, Inc. (Afips) and served for many years as a senior executive of California Computer Products, Inc.

Ifip Congress 77 wil be held here Aug. 8-12, and more than 10,000 people are expected to attend program sessions and special events, plus a major exhibit of computer, hardware, software, systems and services.

The exhibits will be held on the exposition floor of the Sheraton Center.

Dr. Richard I. Tanaka

Ifip Announces Student Rates At Toronto Meet

TORONTO — The organizing committee for the International Federation for Information Processing's (Ifip) Congress 77 has announced a special $30 registration fee for students who wish to attend the international congress here Aug. 8-12.

The fee covers admission to all technical sessions and Exibition 77.

Full-time students with valid identification may register on-site.

Housing accommodations can be made by contacting Marion Hart, Canadian Information Processing Society, Suite 501, 212 King St. W., Toronto, Ont. M5H 1K5, Canada Telephone: 416-366-4586. For those students who are interested, the University of Toronto is offering single rooms at the rate of $12 per day.

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The next ten chapters present advanced assembler language subjects: binary arithmetic, table handling, editing, bit manipulation, translation, subprogram linkage, writing macro definitions, and using sequential, indexed, and direct files. One COBOL programmer told me she never really understood subprogram linkage before she read our book. And a systems programmer says our chapter on writing macro definitions can save hours of research.

The last chapter presents the operating system and its job-control language. It shows you how to code JCL for assembly and test runs, for using macro libraries, for linking object modules, and for using some basic utilities. For the novice, this chapter is invaluable.

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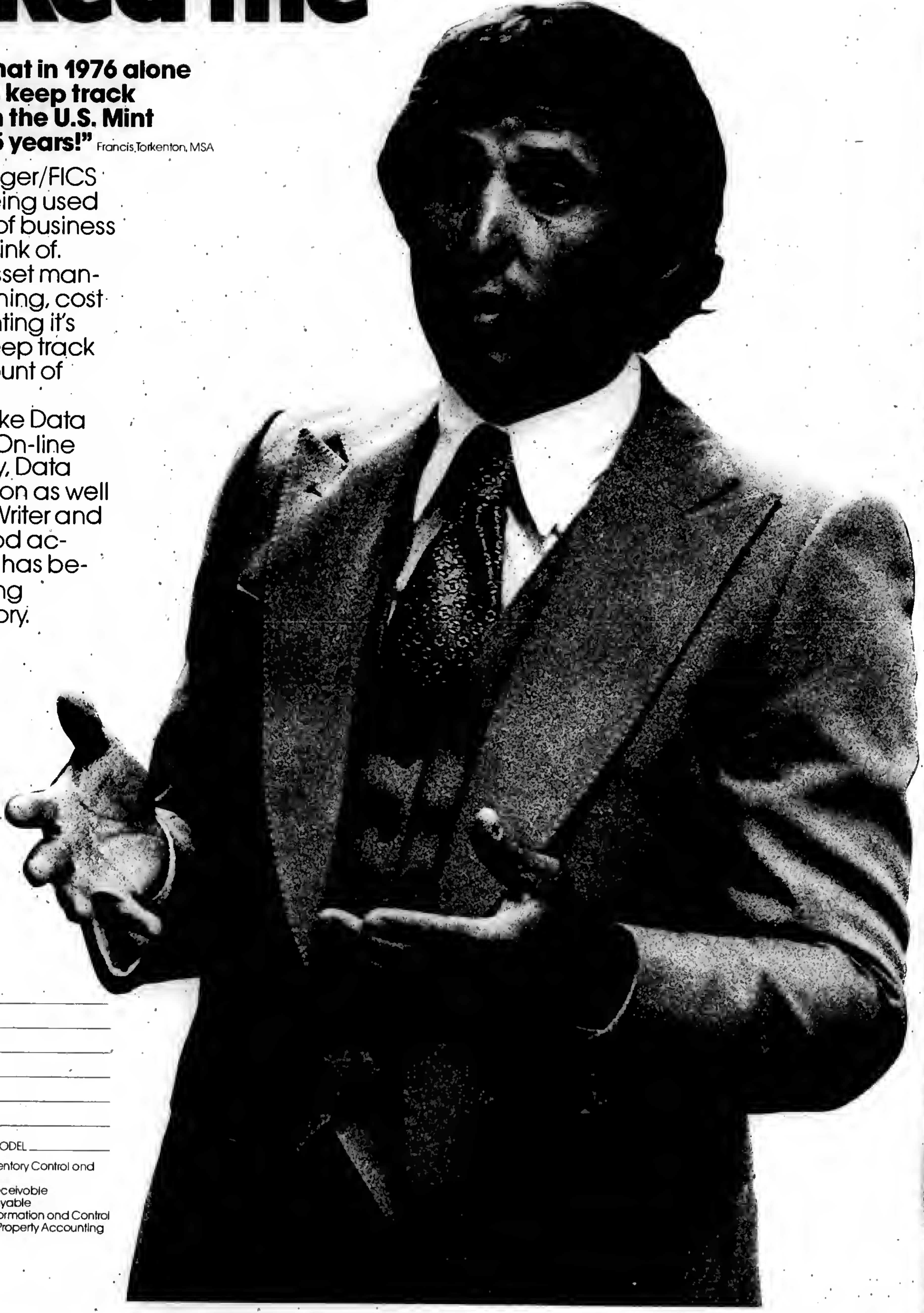

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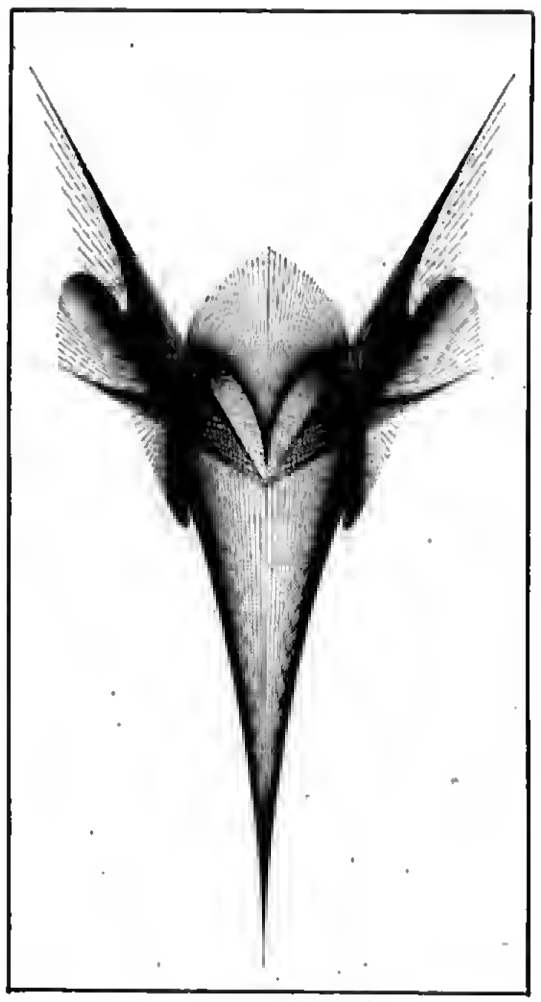


Hummingbird

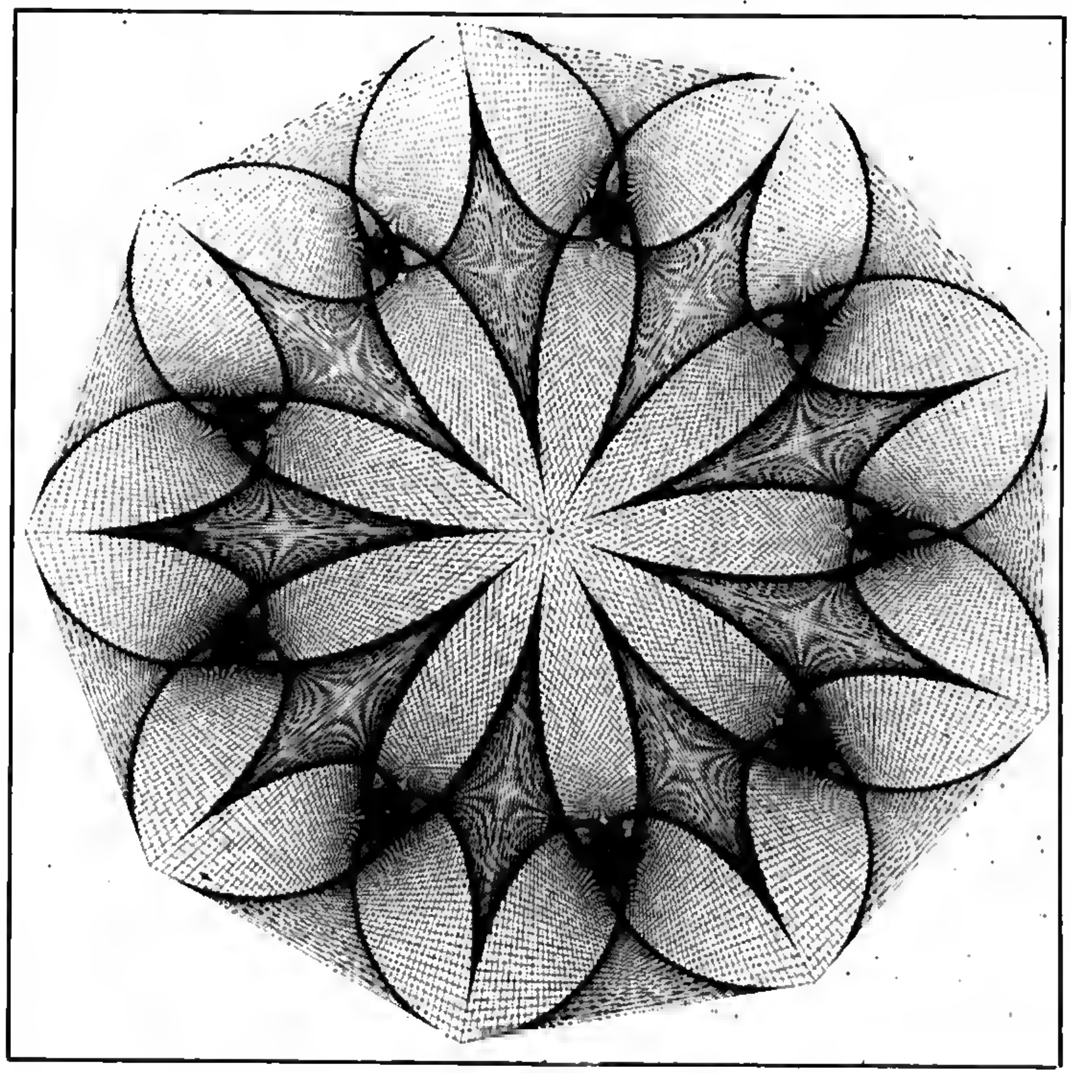
By Nancy French
CW Staff

ANAHEIM, Calif. — Although computer-generated art probably dates back to the late 1950s, interest in the computer as an artist's tool got a big boost from a contest sponsored by California Computer Products, Inc. in 1968.

In that contest, users of Calcomp printer/plotters were invited to compete for a total of $10,000 in scholarships and $1,000 in cash. The contest attracted thousands of entries.

The contest was largely a promotional gimick to demonstrate the capabilities of the company's plotters.

The relatively primitive works shown here, like most of the art from this period, was based on simple Fortran programs, according to a Calcomp programmer.



Symplexity

The artist usually started with a couple of trigometric or exponential functions, he said. These were plotted "to see where the ends of the lines went," and those were then connected with straight lines. More and more lines and angles were added until the design was completed.

These creations, such as the "Hummingbird," "Snail" and "Symplexity" shown here, for example, were named after they were created, based on what the design looked like.

These pieces of art were created by Kerry Strand, who was a Calcomp employee at the time.

The plotter actually played more of a role than merely that of a pen point, the programmer indicated, and that was because, by today's standards, the plotters were relatively slow and not all that precise. The lines they printed had a wavy quality, a Calcomp spokeswoman added.

The "moires," or shimmering patterns within the overall design, were created by superimposing two geometric patterns at acute angles.

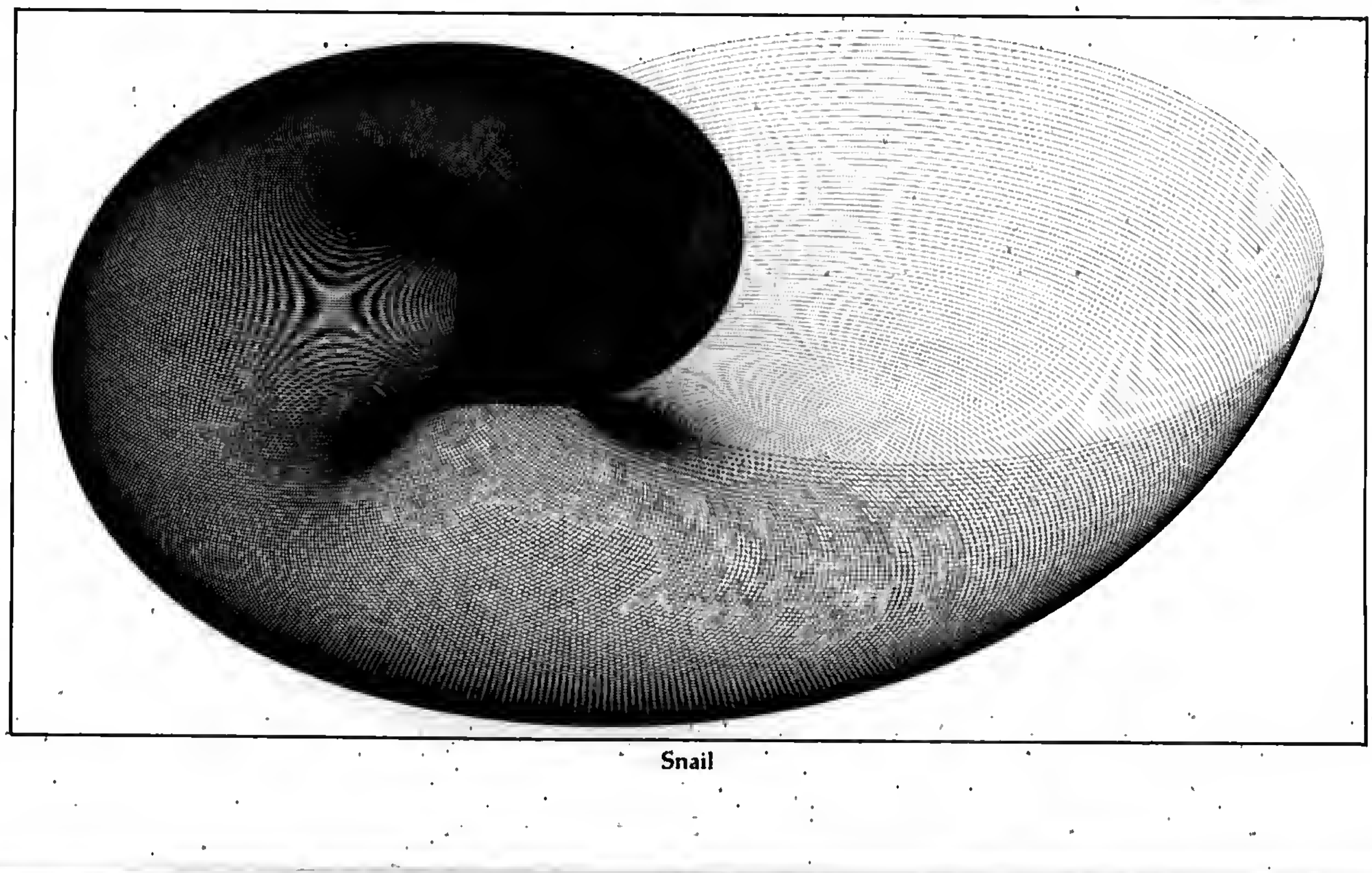
Moires are less common in today's computer art because of the advances in the plotting tools now available, the Calcomp programmer said.

There was no on-line programming in those days either. At Calcomp, the Fortran programs were keypunched and then run through the firm's General Electric 400 computer, where they were compiled and executed.

The results were then output onto magnetic tape and the designs were printed in off-line mode on a Calcomp 702 flatbed printer/plotter, he said.

The three works shown were created generally the same way. Hummingbird was entered in the sixth annual *Computers and Automation* Computer Art Contest in 1968, where it won the top prize, the Calcomp spokeswoman said.

New Masters



Snail

Calendar

Sept. 6-9, Washington, D.C. — **Compcon 77**, sponsored by the IEEE Computer Society. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

Sept. 7-9, Rocquencourt, France — **Data Processing and the Analysis of Data**, sponsored by the Institute of Research in Data Processing and Automation. Contact: Institut de Recherche d'Informatique et d'Automatique, Service des Relations Exterieures, Domaine de Voluceau — Rocquencourt, 78150 Le Chesnay, France.

Sept. 7-9, Boston — **Sixth Annual Conference of the Mumps Users Group**. Contact: Richard E. Zapolin, Program Chairman, Mitre Corp., P.O. Box 208, Bedford, Mass. 01730.

Sept. 9, New York — **Data Processing Librarian (DPL) and Documentation Managers Association (DMA) Meeting**. Contact: DPL/DMA, P.O. Box 572, Bowling Green Station, New York, N.Y. 10004.

Sept. 12-14, Chicago — **Seventh National Seminar: Total Corporate Approach to Data Processing Security.** Contact: Jon Allen, Data Processing Security, Inc., 235 Northeast Loop 820, Hurst, Texas 76053.

Sept. 14-15, El Paso, Texas — **Minicomputer Show and Exposition**, sponsored by the El Paso Chapter of the Data Processing Management Association (DPMA). Contact: El Paso Chapter, DPMA, P.O. Box 1894, El Paso, Texas 79950.

Sept. 15-16, Edmonton, Alta. — **Northwest Systems Conference of the Association for Systems Management (ASM).** Contact: I. Stuparek, 10040 104 St., Edmonton, Alta. T5J2V6, Canada.

Houston Personal Computing Faire. Contact: Richard McClendon, P.O. Box 36584, Houston, Texas 77036.

Sept. 19-21, San Francisco — **Western Electronics Show and Convention (Wescon/77).** Contact: William C. Weber Jr., General Manager, Wescon 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Sept. 22-23, St. Louis — **Datacon '77: Spirit of St. Louis**; sponsored by the St. Louis Chapters of the Association for Systems Management (ASM) and the Data Processing Management Association (DPMA). Contact: John Vaughan, ASM/DPMA, P.O. Box 1401, St. Louis, Mo. 63188.

Sept. 24-27, New York — **Automated Communications 1977**. Contact: John Avers, Automated Communications 1977, Suite 814, 342 Madison Ave., Suite 814, New York, N.Y. 10017.

Sept. 26-28, Arlington, Va. — **Eascon 77,** sponsored by the Institute of Electrical and Electronics Engineers and the Aerospace and Electronic Systems Society. Contact: Wayne Shufelt, Eascon '77 Publicity Chairman, Sperry Univac, 2121 Wisconsin Ave. N.W., Washington, D.C. 20007.

Sept. 26-28, San Francisco — **Government Project Management**, sponsored by New York University. Contact: Government Project Management, New York Conference Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Sept. 26-29, Chicago — **Information Management in the Eighties**, sponsored by the American Society for Information Science (Asis). Contact: Asis, Suite 210, 1155 Sixteenth St. N.W., Washington, D.C. 20036.

Sept. 26-30, Washington, D.C. — **How to Conduct a Performance Audit of Your Computer System**, sponsored by Keston-Barnett Associates, Contact: Dr. Robert Keston or Arnold Barnett, Kestonarnett Associates, Suite 603, 1010 Rockville Pike, Rockville, Md. 20852.

Sept. 26-28, Los Angeles — **MIS Productivity**, sponsored by the Society for Management Information Systems. (SMIS). Contact; SMIS, 10 W. 31st St., Chicago, Ill. 60616.

Sept. 28-30, San Francisco — **Microcomputers: The Application Explosion**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Chris Spark, AIIE, Computer and Information Systems Division, P.O. Box 3727, Santa Monica, Calif. 90403.

Sept. 28-30, Gaithersburg, Md. — **Data Elements Management Symposium.** Contact: Hazel McEwen, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234.

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States With Laws on

By Toni Wiseman
CW Staff

Several states joined the electronic funds transfer (EFT) bandwagon during 1977 and enacted laws to set to rest — at least temporarily — the questions often raised about branching, sharing and various EFT functions.

Spurred perhaps by the sporadic reports and recommendations issued by the National Commission on EFT, the states of Arkansas, Colorado, Idaho, Maryland, Montana, New Mexico, North Carolina, South Dakota, Tennessee and Utah were among those that either approved legislation for the first time or broadened or redefined existing laws.

Thirty-two states currently have laws affecting EFT. Of these, some (such as Kansas) have different laws for banks than for savings and loan (S&L) associations. In toto, 12 laws permit limited branching,

STATE	Applies To	Branching Law	Out Of State Entry	Is Facility A Branch	UNMANNED REMOTE FACILITY							
					Geographical Area	Functions				Sharing		Advance Supervisory Approval
						Deposits	W D	Pre-auth Loans	A C Transfers	Like Institutions	Unlike Institutions	
COMPTROLLER OF THE CURRENCY (Revised Ruling May 9, 1975 Rescinded August 23, 1976)	National Banks	N/A	N/A	No	Within 50 miles of main or branch office^1	Yes	Yes	Yes	Yes	P^2	P^3	Notice only
ALABAMA Act 1127 Laws of 1975	Banks S&Ls CUs	L	Yes Reciprocal only	Silent	Silent	The Superintendent of Banking may authorize activities properly incident to the business of banking through on-premise as well as off-premise operations. Savings and loan associations and credit unions may not offer services now prohibited to them. NO distinction is made between manned and unmanned remote facilities.						
ARKANSAS Act 643, Laws of 1977	Banks	L	No	Silent	Limited	Yes	Yes	Yes	Yes	P	S	Notice only
COLORADO S B 468, Laws of 1977	Banks S&Ls CUs Industrial Banks	U	No	No	Statewide	Yes	Yes	Yes	Yes	M	P	Notice only
CONNECTICUT Public Act 75-373	Banks SBs S&Ls	S	No	No	Statewide^4	Yes	Yes	Yes	Yes	M	M	Yes
FLORIDA Chapter 75-134	Banks S&Ls CUs	L	No	No	Statewide	Silent	Yes	Silent	Silent	P	P	Notice only
GEORGIA Act 169 Laws of 1975	Banks	L	No	No	Limited	← routine banking transactions →				P	P	Yes
IDAHO Chapter 248, Laws of 1976	Banks	S	Silent	No	Statewide	Yes	Yes	Yes	Yes	M^5	M^5	Notice only
S B 1022, Laws of 1977	CUs	S	Silent	No	Statewide	Yes	Yes	Yes	Yes	M^5	M^5	Notice only
ILLINOIS Public Act 79-1387 Laws of 1976	N/A	U	N/A	N/A	Creates an Electronic Funds Transfer System Study Commission "to conduct a thorough study of electronic funds transfer systems and their possible use within the state and to consider the public policy and other considerations including the consistency of EFTS with presently existing statutes." Commission shall report its findings and suggestions to the 79th General Assembly by December 31, 1976.							
IOWA H B 1478 Laws of 1976	Banks S&Ls CUs	L	No	No	Statewide	Transactions which are incidental to the conduct of the business of the financial institution				M	P	Yes
KANSAS S B 515 Laws of 1975	Banks	U	No	No	Statewide	← Banking transactions →				M	S	No
S B 519 Laws of 1975	S&Ls	S	No	No	Statewide	Yes	Yes	Yes	Silent	M	S	No
LOUISIANA Act 241 Laws of 1975	Banks	S	Silent	Silent	Adds incidental power clause allowing commissioner to authorize "consistent with services offered by banks chartered under the laws of the United States."							
MAINE Chapter 500 Laws of 1975	Trust Cos SBs S&Ls	S	No	Yes	Statewide	Yes	Yes	Yes	Yes	M	M	Yes
MARYLAND Chapter 515 Laws of 1975	Banks SBs	S	No	No	Statewide (locations remote from main office or branch)	Yes	Yes	Yes	Yes	P^6	P^6	Yes
Chapter 412, Laws of 1977	S&Ls	S	Silent	No	Statewide	Yes	Yes	Silent	Silent	P^7	P^7	Yes
Chapter 540, Laws of 1977	N/A	S	N/A	N/A	Creates an advisory panel to study and evaluate the benefits and drawbacks of EFTS and to make recommendations to the General Assembly. Interim report is due December 1, 1977. Final report is due December 1, 1978.							
MASSACHUSETTS Chapter 1147, Laws of 1973 and Chapter 32, Laws of 1977	Banks SBs S&Ls CUs	L	No	Silent	Limited	Silent	Yes	Silent	Silent	P	P	Yes
MONTANA Chapter 503, Laws of 1977	Banks S&Ls CUs	U	No^8	No	Limited	Transacting any business in a financial institution				M^9	M^9	Yas
NEBRASKA L B 269 Laws of 1975	Banks	U	No	No	Silent	Yes	Yes	Yes	Yes	M	S	Yes
NEW HAMPSHIRE Chapter 233 Laws of 1975 (Wild Card)	Banks SBs S&Ls	L	Silent	Silent	The Board of Bank Incorporation may promulgate rules permitting any bank or cooperative bank to establish and maintain electronic devices or machines similar to those permitted by the Comptroller of the Currency for national banks, or by the Federal Home Loan Bank Board for federal savings and loan associations.							
NEW JERSEY Chapter 148 Laws of 1975	Banks SBs	S	No	Yes	Statewide	Any business conducted at principal office				P^{10}	P^{10}	Yes
Chapter 159, Laws of 1975	S&Ls	S	Silent	Yes	Permits establishment, with the Commissioner's approval of "limited facility branch offices" which may be fully automated. Commissioner must adopt regulatory requirements "in substantial conformity" with those of the FHLBB.							

EFT Now Number 32

21 allow statewide branching and seven sanction unit branching.

Only five states — Maine, Oregon, New Jersey, New Mexico and New York — define remote facilities as branches. Ten states, however, have remained silent on the issue.

Sixteen states have mandatory sharing provisions for like institutions, while only seven mandate sharing among unlike institutions.

Along with the new legislation, industry observers are witnessing a flood of new lawsuits challenging these laws.

The Michigan Bankers Association, for instance, has filed suit to ban a banking commissioner's order permitting state credit unions to issue share drafts.

In another one, the Justice Department has brought an antitrust action aganst the Rocky Mountain Automated Clearing House Association located in Denver. The suit charges conspiracy on the part of the bankers to deny credit unions and S&Ls equal access to clearing facilities.

These charts, recently updated by the American Bankers Association (ABA), give a state-by-state overview of legislation currently in force which covers EFT systems [CW, Dec. 6].

They detail which financial institutions are covered by law in each state, the nature of a state's bank branching law (S-statewide, L-limited branching, U-unit banking) and whether and under what conditions units owned by out-of-state banks are permitted.

The charts also illustrate whether a state treats remote facilities as branches.

For unmanned remote facilities, each state is reviewed to determine if and to what extent distinctions are made between manned units such as point-of-sale (POS) terminals and unmanned units such as automated teller machines (ATM).

If a state law permits unmanned remote facilities, the law is screened to determine where it permits a facility to be located.

The charts also examine whether a facility can accept deposits or dispense cash (W/D); if lines of credit or preauthorized overdraft privileges are available through the units; and whether transfers between accounts, such as savings and checking, are permitted (A/C Transfers).

Each law is examined to determine if an establishing financial institution must share its unmanned remote facility with other institutions and whether such sharing is mandatory (M), a permissive requirement (P) or silent (S).

The laws are also categorized to show whether institutions may or must share with like institutions — banks with banks, savings and loans (S&L) with S&Ls — and with unlike institutions (banks with S&Ls).

Finally, the ABA has examined whether the governmental official with jurisdiction over financial institutions must act to authorize a facility or if only notice of intent is required.

State	Applies To	Branching Law	Out Of State Entry	Is Facility a Branch	Unmanned Remote Facility							
					Geographical Area	Functions				Sharing		Advance Supervisory Approval
						Deposits	W D	Pre-auth Loans	A C Transfers	Like	Unlike	
										Institutions		
NEW MEXICO Chapter 359, Laws of 1977	Banks S&Ls CUs	L	No	Unmanned Yes Manned No	Limited	Yes	Yes	Yes	Yes	P	P	Yes
NEW YORK Chapter 764, Laws of 1975	Banks SBs S&Ls	S	Silent	Yes	Permits establishment of ATMs and POS terminals pursuant to regulations of the banking board. Such devices engaged in "deposit-withdrawal activities" are branches. Numerical restrictions on new branches for savings banks and S&Ls do not apply.							
NORTH CAROLINA Chapter 553, Laws of 1975	Banks	S	No	No	Subject to the rules and regulations of the State Banking Commission, banks may establish manned or unmanned off-premise facilities.							
Chapter 473, Laws of 1977	S&Ls	L	Silent	No	Statewide	Any financial service or transaction rendered to the public				P	P	Yes
NORTH DAKOTA H B 1542 Laws of 1975	Bank of N D	U	N A	No	The N D State Bank may establish EFT system for its customers and customers of other financial institutions authorized to utilize such services (includes State banks)					M	M	Yes
S B 2443 Laws of 1975 (Wild Card)	Banks		Silent	No	Silent	Yes	Yes	Yes	Yes	M	S	Yes
OKLAHOMA S B 590 Laws of 1976	Banks	U	No	No	Silent	Any transaction contracted for at main office				M	P	Notice only
OREGON Chapter 797, Laws of 1973 (Repealed by H B 2644 Laws of 1975)	Banks	S	Silent	Silent	Silent, except if more than 4 units	← General banking business →				S	S	Notice only for first 4 units, approval for 5th or more
H B 2644 Laws of 1975	Banks SBs		Yes[12]	Yes	Silent	Yes	Yes	Yes	Yes	M	M	Notice only 30 days after installation or removal
RHODE ISLAND Chapter 290, Laws of 1975 (Wild Card)	Banks SBs S&Ls CUs	S	Silent	No	Provides that every financial institution may establish CBCTs to the same extent and only during such periods of time that competing financial institutions federally regulated and domiciled in the state are permitted to provide. Supervisory approval is required. Sharing is permissive with all financial institutions.							
SOUTH CAROLINA Ratification No 375,[13] Laws of 1975	Banks S&Ls CUs	S	No	Silent	Statewide	← Silent →						Yes
SOUTH DAKOTA H B 644 Laws of 1976	Banks	S	Yes	No	Statewide	Business of banking				M	S	Notice only
H B 878 Laws of 1977	S&Ls	L	Yes	No	Statewide	Savings and Loan Business				M	S	Notice only
TENNESSEE Chapter 274, Laws of 1977	Banks	L	Silent	Silent	"a state bank may exercise any power or engage in any activity involving the electronic transfer of funds which it could exercise or engage in if it were a national bank located in Tennessee"							
UTAH S.B. 44 Laws of 1977	Banks S&Ls CUs	S	Silent	Silent	MORATORIUM UNTIL JULY 1, 1979. Permits Bank Commissioner to authorize experimental EFT systems. (Should a Court or the Congress authorize establishment of EFT systems in Utah prior to July 1, 1979, then Commissioner shall grant financial institutions same authority.)							
VIRGINIA Chapter 535 Laws of 1976 (wild card)	S&Ls	S	The State Corporation Commission may adopt regulations defining what activities may be performed at an									
Chapter 554 Laws of 1976	Banks	S	Silent	Silent	Limited	Yes	Yes	Yes	Silent	P	P	Notice only
WASHINGTON Chapter 168-XXX Laws of 1974	Banks MSBs S&Ls	S	Silent	No	Statewide	Yes	Yes	Silent	Yes	Bank owners M MSBs & S&Ls P	Bank owners P MSBs & S&Ls P	Yes
WISCONSIN S B 415 and S B 826, Laws of 1976	Banks S&Ls	L	Yes[14]	No	Statewide	"transactions which are incidental to the conduct of the business" of a bank or S&L				Banks & S&Ls[15] M Retail owners P	Banks & S&Ls M Retail owners P	Yes

---

1 Although this ruling has been rescinded, it is included in this chart because it was looked to by many states when they enacted legislation Effective November 3, 1976, the Comptroller's Office issued revised procedures for national banks to establish CBCT branches in states where state banks are permitted by law to establish traditional branches or CBCT branches

2 Permissive sharing within 50 miles, beyond that distance a CBCT must be made available to local financial institutions

3 Home office protection is provided

4 Other owners must share with banks; may share with S&Ls and CUs

5 To the extent consistent with anti-trust laws, sharing is required

6 The Bank Commissioner may establish rules and regulations for the operation and sharing of facilities to the same extent and effect as rules and regulations promulgated by the Comptroller of the Currency with respect to sharing and operation of facilities by national banks

7 An association may not enter into an agreement to use a terminal at a location where other financial institutions would be prohibited from doing business

8 A customer of an out-of-state financial institution may debit his account at an in-state terminal to pay for merchandise or services, provided the merchant credits an account in a Montana financial institution

9 Non-discriminatory access must be made available to all financial institutions or branches located within the area that may use the terminal.

10 Commissioner may require sharing with institutions insured by FDIC or FSLIC.

11 Establishes parity with federally regulated financial institutions, including federal S&Ls.

12. Out-of-state bank may use facility if Oregon bank may use facility in home state of non-Oregon bank

13. Provisions of act effective until July 1, 1977.

14. Out-of-state banks may use a facility in Wisconsin if consent is given by a Wisconsin bank using the terminal

15 Savings banks may share facilities established by either a bank or savings and loan association

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WANG

Editorial

The Dilemma of Reorganization

Just under a year ago a national commission recommended "that there be established in the Executive Office of the President an Office of Information Policy."

Instead of following that recommendation — made by the Domestic Council Committee on the Right of Privacy under then Vice-President Nelson Rockefeller — President Jimmy Carter has chosen to downgrade the role of the one agency dealing with information policy in the White House, the Office of Telecommunications Policy (OTP) [CW, July 25].

Like almost every issue to be faced by government, this one has two sides.

There is a crying need for reform and reorganization within the executive branch of the government. Unneeded agencies should be abolished, others need reorganization and still others need to be made more effective.

This was one of President Carter's main campaign themes and it will be one of his Administration's major thrusts.

On the other side of the coin, however, there is a need for a coordinated national information policy.

As the Rockefeller report noted: "A great number of public policy questions are being generated by advances in computer and communications technology, by shifts in the U.S. economy from a manufacturing base and by citizen demands for clarification of their rights to have and control information.

"The answers to the questions which are being raised will make up the national information policy, whether they are arrived at consciously or unconsciously, by commission or omission, carefully or haphazardly, in a comprehensive or in a piecemeal fashion. The issue thus is whether or not government will attempt to take a considered unified approach in arriving at these answers."

Frankly, we're stuck between a rock and a hard place, as the old expression goes. We feel reorganization is necessary, but there is also a need for a strong coordinated national information policy, with White House direction and support.

And that's the problem with the whole idea of reorganization — and a concomitant reduction — of government.

Most people agree it is a good idea — as long as it does not happen to their pet projects and interests. The environmentalists say "fine" to reorganization in principle, but "no" to abolishing the Council on Environmental Quality; the bureaucrats are all for it, as long as their agencies are not threatened; business is all for reduction in government, except for those programs that aid business; and so on ad infinitum.

Probably one of the reasons the OTP was among the first White House agencies to get the ax is that it does not really have a well-defined special interest group to support its existence.

Certainly the American Federation of Information Processing Societies (Afips), which wrote Carter in support of the OTP programs, cannot be considered a very effective voice for the agency. After all, it doesn't even take stands on issues, much less deliver the votes.

And generally — let's face it — the user and vendor communities are not very vocal on any of the major issues handled by the OTP. The only vendor organization that consistently takes stands in Washington is the Computer & Communications Industry Association; the user community has no representation at all.

So while the idea of a national information policy coordinated in the White House is a good one, it clearly does not have a constituency in the computer community, much less in the general populace.

It should come as no surprise, therefore, that the OTP will be one of the first casualties of government reorganization. Without strong support, it probably deserved to die.

Data Past

Five Years Ago
Aug. 2, 1972

WASHINGTON, D.C. — Sen. John V. Tunney (D-Calif.) introduced a bill requiring banks and other financial institutions to protect the privacy of their customers. His bill was an amendment to the Bank Secrecy Act of 1970 and would require banks, credit card companies and other "financial institutions" to treat all customer accounts as confidential. A subpoena, court order or the customer's permission would be required before any information could be disclosed.

— — —

OMAHA, Neb. — In a week of confusing legal activity, one court barred IBM from making a product announcement but was later overruled on an IBM appeal. IBM then said it would announce two models in the 370 series — the 158 and 168 with Virtual Storage.

Eight Years Ago
Aug. 6, 1969

NEW YORK — IBM introduced the System 3, designed for small business firms. The system included a 96-column punched card with 20% greater information capacity than the 80-column card, RGP-II and monolithic systems technology enabling switching speeds of 8- to 12 nsec.

Letters to the Editor

Are DPers Playing Charades Around Human Rights Issue?

I read the Reader Commentary in the July 18 issue ["Is Supplying DP Training to Iranian Police Ethical?"] with great interest. The subject was timely and one which I hope will receive greater attention in the future.

Jack Stone's argument did little to allay the concern I have for the way we relate as an industry to unjust or repressive institutions in our world.

In the final analysis, Stone stated that he would have violated the trust of his customer and ignored the foreign policy of our country if he had not taken the job.

I found Stone's comments quite disturbing, not because I believe him to be a bad man (which I don't), but precisely because I think that his arguments reflect the general or even "the highest level of ethical standards present in the computing industry."

If we let business interests outweigh human life and freedom in our consciences, then we are merely playing charades when we talk about our concern for human rights.

Max D. Bishop

Detroit, Mich.

On Being a Committee of One

I read the interchange between Saul Tannenbaum and Jack Stone on the ethics of Stone's training the Iranian police [CW, July 18]. I wish to comment.

I do not accuse Stone of unethical conduct since he is obviously unclear about the nature of the Iranian regime. But now that he has been told of the nightmarish character of that government, I believe it his duty to investigate further before undertaking any further assistance to it.

Stone asked, "Do I become a committee of one and reject my students and turn aside my customer and, in another dimension, discard the policy of friendship with the Iranian government, which is the established policy of the U.S.?"

He answers "No." I answer "Yes."

A person's behavior is his own responsibility, not that of his students, his customer or the U.S. government.

Alan Meyer

Baltimore, Md.

Articles on Report Writer?

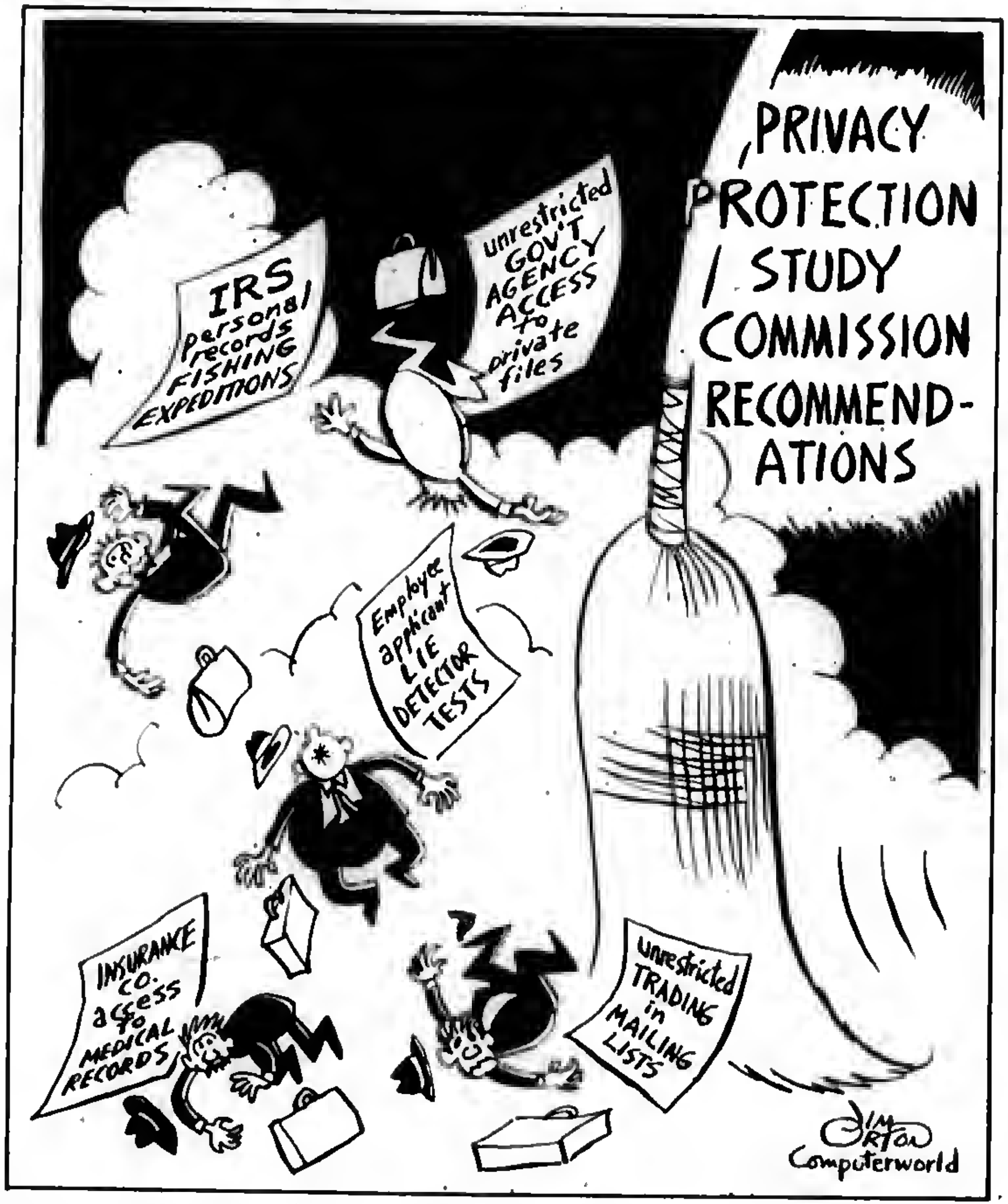
I am responding to William Englander's recent call for information regarding the Cobol Report Writer [CW, July 11].

I have been looking for comparison studies between the conventional use of Cobol write statements and the Cobol Report Writer features and have come across only one article on Report Writer, "Using the Cobol Report Writer," by Harry T. Hicks Jr. It appeared in the September 1972 issue of Dotomotion.

Like Englander, I also would encourage any CW readers to respond if they find any information concerning Cobol's Report Writer.

Randy Hargens

Portland, Ore.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A New Broom

DP Teams Need Greater Self-Awareness

By Jack Stone
Special to CW

Last week, I presented the first part of an interview with William j. Front and Carol M. Vaughan of the U.S. General Services Administration, who are exploring new ways of improving the organization, communications, member atttitudes and creative climate of the DP project team.

We talked of "team development," a set of strategies developed by behavioral science researchers which are designed to improve results from the project organization by creating a positive atmosphere of confidence and coordination. This situation is brought about by first matching individual members' needs and project needs more effectively, and then establishing a climate for interpersonal communications and cooperative activity.

In this column, we discuss the Frost/Vaughan application of the team development process to their DP communications problems.

Q: How have you addressed this rather challenging problem of building and developing successful project teams?

Frost: We have approached the team development problem just like any other DP project. The first step, of course, was setting down the objectives, which we did after considerable research and study. The first objective is to have each member of the project team assess how he or she works in a group and how he or she relates to the supervisor and other "nonsupervisors" in the work environment.

The second objective is to examine the current operating patterns of the project organization and to construct alternatives by examining the effects of human behavior on individual and organization achievement. The third objective is to have each member of the team learn new tools and techniques to help the team achieve creative, productive solutions to DP problems.

And the final objective is to have the team, as a functioning unit, apply these tools and techniques to team problems.

Q: What is the general format of the team development project?

Vaughan: The heart of the project relies on the team itself to use team concepts in solving everyday problems that affect the group; members manage their own learning and monitor their own behavior. But first they need some common understanding and goals. These are agreed upon in a two-day workshop led by a "facilitator" trained and experienced in team development.

The Human Connection

Q. And how is the two-day workshop conducted?

Vaughan: The first day and a half is devoted to meeting the first three objectives. Now, to help the team members assess, in effect, individual and team behaviors, we use a variety of techniques including survey instruments based on the "managerial grid" and the "Johari window," role playing exercises, instruction in the style and techniques of "brainstorming" and problem-solving and an introduction to the principles of team development and behavior.

Frost: Then, the final half day provides "live" workshop instruction.

A particular problem is selected by the group and is analyzed using the problem-solving techniques learned earlier in the class. The techniques, by the way, include a standard set of problem-solving steps whch is used by the team as a guide.

Obviously, the last half day is most crucial. Success of the class is in great measure determined by the openness and cooperative spirit of the team.

Q. The "Managerial grid" sounds interesting. Just what is this technique and how does it help team development?

Frost: The grid, as developed by Blake and Mouton, is based on the concept that a project manager has two major concerns regarding the final project product: concern about the project people and concern about project results. The grid is a two-dimensional graph which provides a representation of managerial style by plotting "people concern" on the vertical axis and "results concern" along the horizontal. Concerns are measured on a quasi-quantitative basis on a scale of 1 to 9. Thus a 9:1 manager is interested

(Continued on Page 14)

Australian Trade Law Causing DP Furor

The Taylor Report

By
Alan
Taylor
CDP

Richard St. John of the Australian attorney-general's office explained that the recent contretemps between IBM and the Australian government, which resulted in "most" IBM products becoming unavailable there, at least temporarily, originated after Parliament amended the Trade Practices Act so as to protect the common-law rights of hospitals, businesses, schools, etc. — and those of "natural persons."

The common-law rights to which he was referring are built into the laws of most American states, as well as those of Australia and many other places, and they basically allow someone to recover damages resulting from improper behavior. However, it has until now been permissible for contracts to exclude such rights, and IBM has quite properly done so.

During the passage of the bill, St. John told me, there were no objections raised by IBM, but after the bill went into effect on July 1, IBM told the Australian government it was not prepared to work under the provisions of the act, because it created too great a risk for the firm. Other manufacturers followed the IBM lead.

Apparently the Australian government was unimpressed by this late claim, at least on the surface. It simply pointed out the company's prior silence on the matter.

That was as far as the issue had gone when this column was being written, although developments may have obsoleted this particular report by the time you read it. However, it seems unlikely that the basic situation which leaves Armonk and Canberra in a potential confrontation situation will be more than papered over at best. It is quite possible that this may be the nucleus which will show users here, as well as in Australia, just how much risk they are taking through accepting standard contracts. So let's look at the situation.

Australia & Computers

Australia's computers are currently being supplied by three different countries: the U.S., Japan and England. In real terms, however, the American interest is predominant, with only some 181 English-based systems and 18 Japanese systems reported in the May 1977 computer census figures, compared with some 1,200 U.S. systems.

IBM is predominant, both in the number of systems and in their size. There are, for instance, some 57 370s in the 145 or larger range and 24 360s at least 360/50s. There was a reported total of 312 IBM systems in the country.

Beyond the actual IBM-owned computers, the firm's influence goes further, with IBM services providing maintenance for IBM and non-IBM systems alike. Even where maintenance is not being directly handled by IBM, IBM is supplying the parts to the people who perform the maintenance. Potentially, therefore, it would be possible for an IBM withdrawal to effectively strangle the use of any or all of the 312 installed IBM systems.

The contracts IBM was offering prior to the current situation were no different from those they offer on a worldwide basis. As in the U.S., users in Australia were not protected from IBM's simply announcing it was changing the terms under which it operates. And, in fact, like most of IBM's customers worldwide, they received the April announcement of IBM's intention to change the contractual terms unilaterally, when it suited the corporation to do so.

Both the old contract, which is still operating, and the new terms IBM has said are coming greatly limit the ability of a user to make more than a small recovery of damage caused by IBM's misbehavior. These are the terms IBM feels it cannot live without, and these are at the center of the current dispute.

There have, of course, been situations in other countries before where IBM's contract terms were not acceptable. As far as I can find out, however, such countries, unlike Australia, have not been supporters of free enterprise. The continued use of any installed IBM computers was negotiable with some government body that would handle the purchase of spare parts, software, etc. on a countrywide level.

But Australia is different. There is no government agency which controls the computer sites and can negotiate as a unit. Australia falls into the standard user-to-IBM situation, and IBM may well feel that any substantial consideration given to the Australian user will have to be similarly provided to users in other countries.

Certainly the corporation would be hard put to explain to other governments why their nationals should not be equally protected from IBM errors as Australia's nationals.

Australia, however, would be equally hard put to explain to its voters why IBM should have any preferred treatment at the expense of Australian organizations.

Further Complications

The problem is further complicated by the current composition of the IBM board and that of the Carter Administration. The sight of T. Vincent Learson and the other former Ford Administration directors returning to their top-level positions when Carter came in makes any protestations of impartiality or separation from the company appear mere rationalizations of some legal fiction..

In fact, any pro-IBM action by the Carter Administration will probably — unless specially insulated from IBM connections — to be regarded as a use of U.S. influence to protect a private multinational.

And yet, unless matters are settled quickly (which seems unlikely, considering the scope of the controversy and the number of other U.S. firms that trade under similar contract conditions across the world) some U.S. government actions seems inevitable. American jobs in research and production are at stake as well as the property of a major U.S.-headquartered firm.

One can't just stand aside at that point and hope that everything will go away. Yet, currently the White House apparently has no plans as to how to insulate its actions from the IBM taint.

This suggests that accidental confrontation can very, very easily occur. Let us watch what happens and hope that computer users will find their situation improved, and not damaged, at the end of the battle.

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CCP Won't Replace CDP

Articles on Certification Rife With Paranoia

By Jim Brown

Special to CW

Three pieces on certification in the June 20 issue of *Computerworld* offered more misinformation and paranoia than fact. I refer to Ken Lord's fears of seeing the Certificate in Data Processing (CDP) outdated, John D. MacLean's letter calling licensing a "cop-out" and L.D. Rizio's reader commentary on licensing.

Ken Lord appeared 180° off course, MacLean was off on another tangent and Rizio had some good answers to the wrong questions.

Let's start out on the far end of the limb and try to bring all three back to the real world.

The Certificate in Computer Programming (CCP) exam will be offered by the Institute for Certification of Computer Professionals (ICCP) beginning Oct. 22. Contrary to Lord's "Corner" column, this certificate is in no way a replacement, substitute, prelude or "capstone" to the institute's already established CDP program.

The CDP program is directed primarily at business-oriented DP on the management or supervisory level. The CCP exam is targeted at the upper skill levels of those practicing business, scientific or systems programming.

These areas certainly can overlap as career paths, but as testing subjects and certification goals, the knowledge required of the successful candidate is markedly different. The accomplishment of either certificate is an end in itself.

There is room for both to coexist, as well as new exams in DP auditing, systems analysis or other potential subjects. One, both or more might be appropriate to an individual's goals.

MacLean's letter to the editor was obviously a reaction to the CCP program, although he failed to distinguish licensing from certification and, after raising legitimate content questions, did not carry through to see how or if such questions had been resolved by the CCP Certification Council under Dr. William Cotterman of Georgia State University.

What of MacLean's image of a poor programmer, born and raised in Autocoder? Is the ICCP going to force him, kicking and screaming, to learn PL/I against his will (wreaking havoc upon life, liberty and the pursuit of wordmarks?)

The exam covers programming, not coding. Emphasis is on techniques, thought organization and practices rather than language mechanics. Even more, anyone who claims, for example, to be a senior programmer in a business environment without having at least a reading knowledge of Cobol is smoking his tennis shoes.

The demarcation between certification and licensing is an important one. Certification carries no legal sanction, but licensing can stand in somebody's way of making a living. The distinction leads us directly to Rizio.

Rizio's commentary was certainly the most accurate of the three I have cited. The only point of contention is my belief — or hope — that licensing is a possibility far more remote than Rizio seems to think.

The point that "we are not knowledgeable enough to be able to detect all fraudulent activities, improper procedures or poor systems designs" is well taken. Licensing would attempt to force good practices, but certification addresses the issue from a different angle.

Certification encourages continuing education and expansion of the individual's capabilities. Secondly, it serves as a consciousness-raiser to alert people that ethics, good practices, codes of good conduct and responsibility are indeed considerations for each individual to address. Read Donn Parker's fraud studies and find out how many people didn't even think they were doing anything wrong.

Reader Commentary

Revoking a license cannot enforce that consciousness; but encouraging a certificate can engender it.

The ICCP, representing eight professional societies on the subject, said in January of 1975 that ". . . at the present time there are no generally accepted definitions of job functions . . . or agreement upon knowledge and skills to practice in those jobs. Consequently, licensing will be premature until the needs stated above are met."

One might speculate whether those needs can ever be met.

Can you defino a "professional" in data processing? Don't look in a mirror — yet. "Professional" is the greatest buzzword to hit recruiting ads since "Equal Opportunity M/F." How does "professional" tie in with certification?

Certification provides a uniform measure of knowledge and performance potential. To the practitioner, the certificate is a credential of substance in self-assessment and peer group evaluation.

Certification offers a challenge, and willingness and ability to meet that challenge is a good working definition of professionalism. Some feel that DP won't be a profession until we fit into the mold of doctors, lawyers and accountants.

Until Marcus Welby operates on a data base or Perry Mason solves his first core dump, we need to look for images without so much romanticism.

Brown, monufocturing systems project leoder for Crone Co. in Chicogo, is on the boords of directors of the ICCP ond the Associotion of Computer Progrommers ond Anolysts.

Teams Need Awareness

(Continued from Page 13)

in results to the exclusion of people, and a 1:9 manager focuses on humanistic concerns to the exclusion of results.

Vaughan: We administer contrast surveys based on the grid during the class, one for supervisors and one for nonsupervisors. These surveys enable each individual team member to plot his dominant and backup styles. As the results are discussed, each team member becomes quickly aware of the attitudes he brings to the team.

Q. And the "Johori window"?

Frost: This is another graphical technique which helps team members understand the dynamics of team communications. We have a style of rectangular plots which present a simplified model of the interactive communications process. On the horizontal we plot information that ranges from that which is known to that which is unknown to the *individuol*. On the vertical axis we plot information that ranges from that which is known to that which is unknown to others.

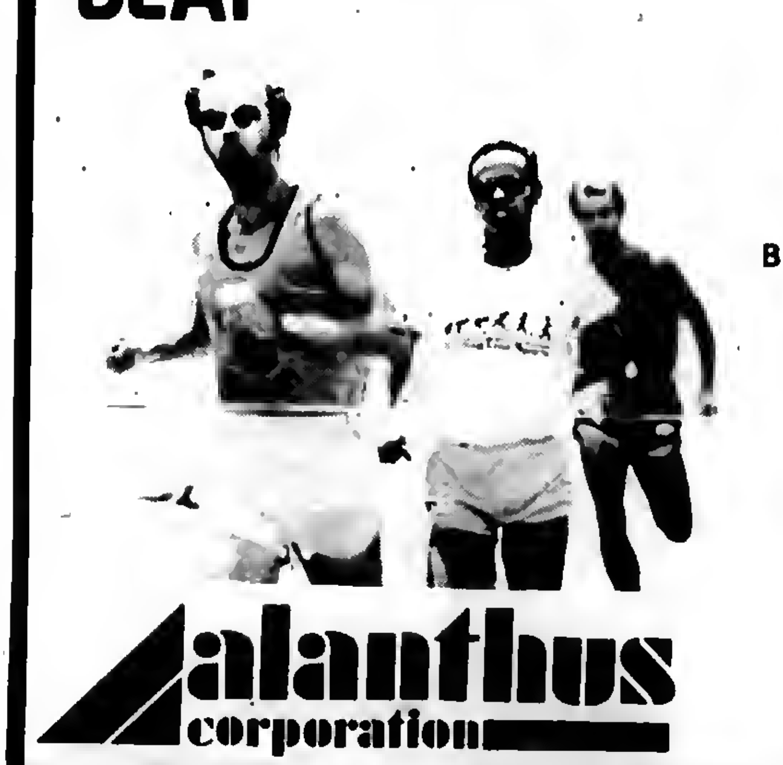
Vaughan: We use contrast surveys based on the "Johari window" to provide insight as to how the manager believes he is communicating to employees, in contrast to how the employee perceives this communication.

Since there is usually a disparity which can be depicted on the graph on a quasi-quantitative basis, the group can proceed to examine the causes for this misunderstanding and take action to adjust.

Q. Will you comment on the results of your explorotions thus for?

Frost: Surely. We have implemented a number of programs during the past three years. Although they must still be considered as pilot in nature, we are pleased with the results thus far.

We have documented the results in our paper "Within Context — The Application of Team Concepts to Work Teams," to be delivered at the annual meeting of the Association for Computing Machinery Special Interest Group on Computer Personnel Research, which takes places on Aug. 18 and 19 in Washington, D.C.



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'Abend-Aid' Aids MVS

CLEVELAND, Ohio — Release 2 of the Abend-Aid source-level debugging tool from Tomark is said to eliminate the potential conflicts this package might have with others attempting to do specialized Abend processing.

The package controls and formats the information dumped on the printer when the system hits a program check causing an abnormal end of execution of the then-current program. Users can select the data and format, if any, they wish for each type of Abend.

A major enhancement in the new release protects the user from losing data in the event of recursive program checks. Another enables the debugger to be used in an MVS environment, a spokesman noted.

For users working with data bases, the Abend-Aid update also provides for the diagnosis of IMS completion codes for both batch and on-line program crashes. The package traces the control chain to the application program level, he said.

Abends occurring in an IMS environment can be handled differently from the same abends in a non-data base setting, he stated, and an IMS user code Abend extension is now being tested.

Price of the package is $2,975 for OS/VS systems and $3,975 for MVS installations, Tomark said from 5645 Beacon Road, Cleveland, Ohio 44131.

'Dynam/D' Controls Pooled Disk Space

NEW YORK — Support for pooled disk space and for several versions' of individual files are among the enhancements built into release 1.1 of Dynam/D, the disk space and catalog management software system for IBM DOS and DOS/VS from Computer Associates, Inc.

The package determines space available on a specified disk and dynamically allocates that space as a file is opened, not before the job is initiated. The package also allocates additional space if the space originally requested isn't enough, a spokesman explained.

The disk pool management facility allows the user to select from a group or pool of disk volume serial numbers to be used for the space allocation. Disk space allocations can therefore be set up to relate to the partitions in which a program is executing.

In this way, a better balancing of disk use is achieved, the spokesman claimed. The user can also define protected areas on any disk and these would never be used by Dynam/D, he added.

The generation data set facility is especially useful when an installation has a need to create and be able to access multiple generations of a given file, he said.

Facilities to backup and restore direct access storage device files are also part of release 1.1, allowing the user to save a disk file on tape and bring it back later to disk.

A display facility for the Dynam/D catalog file enables the user to determine all the attributes related to any file defined in the catalog.

An interface between Dynam/D and the vendor's CA-Sort allows work space on sorting tasks to be released after the input file has been initially read by the sort system.

Dynam/D is available for as little as $5,000 depending on options selected, Computer Associates said from 655 Madison Ave., New York, N.Y. 10021.

'Price' System Estimates Software Costs, Timing

MOORESTOWN, N.J. — DP managers can now get help in estimating the costs involved with major software projects by utilizing the Price S modeling system from RCA, which has been installed on several remote-computing service networks.

Price S is said to permit rapid evaluations based on project size, type difficulty and scheduling constraints. System configuration, desired percent of system utilization and reliability requirements are also factored into the model, a spokesman noted.

The system is an interactive operation with conversational input and output, structured around regression techniques and internal self-checking to validate the input before it is used, he said.

In addition to definitions of the technical aspects of the project, Price S also accepts user-selected economic and technology growth factors to produce cost breakouts of five categories in each of three overlapping development phases. The categories are systems engineering, programming, configuration control, documentation and program management.

Resource expenditure profiles are provided for each of the development phases — engineering design, implementation and test and integration — together with controls that will adjust these profiles to user requirements, the spokesman explained.

Operation Modes

Normal operation computes costs directly from user inputs. Ecirp mode, on the other hand, enables Price S to run "in reverse" to calculate empirical data factors from known project costs — an "extremely useful" feature for model calibration, he added.

Geosyn, the third mode of operation, uses specified costs to compute typical program sizes and project schedules. This allows Price S to be used to investigate feasibilities and to set scope-of-work goals for design-to-cost efforts, he continued.

Network Choice

Price S is currently on the American Information Services network, based in Greenwich, Conn., and the On-Line Systems net, headquartered in Pittsburgh. Unlimited use of the system through one terminal is available for $30,000/year (payable to RCA) plus the cost of the service vendors' resources.

RCA also offers a three-day training course, at $600/trainee, the spokesman said from the company's Government Systems Division, Moorestown, N.J. 08057.

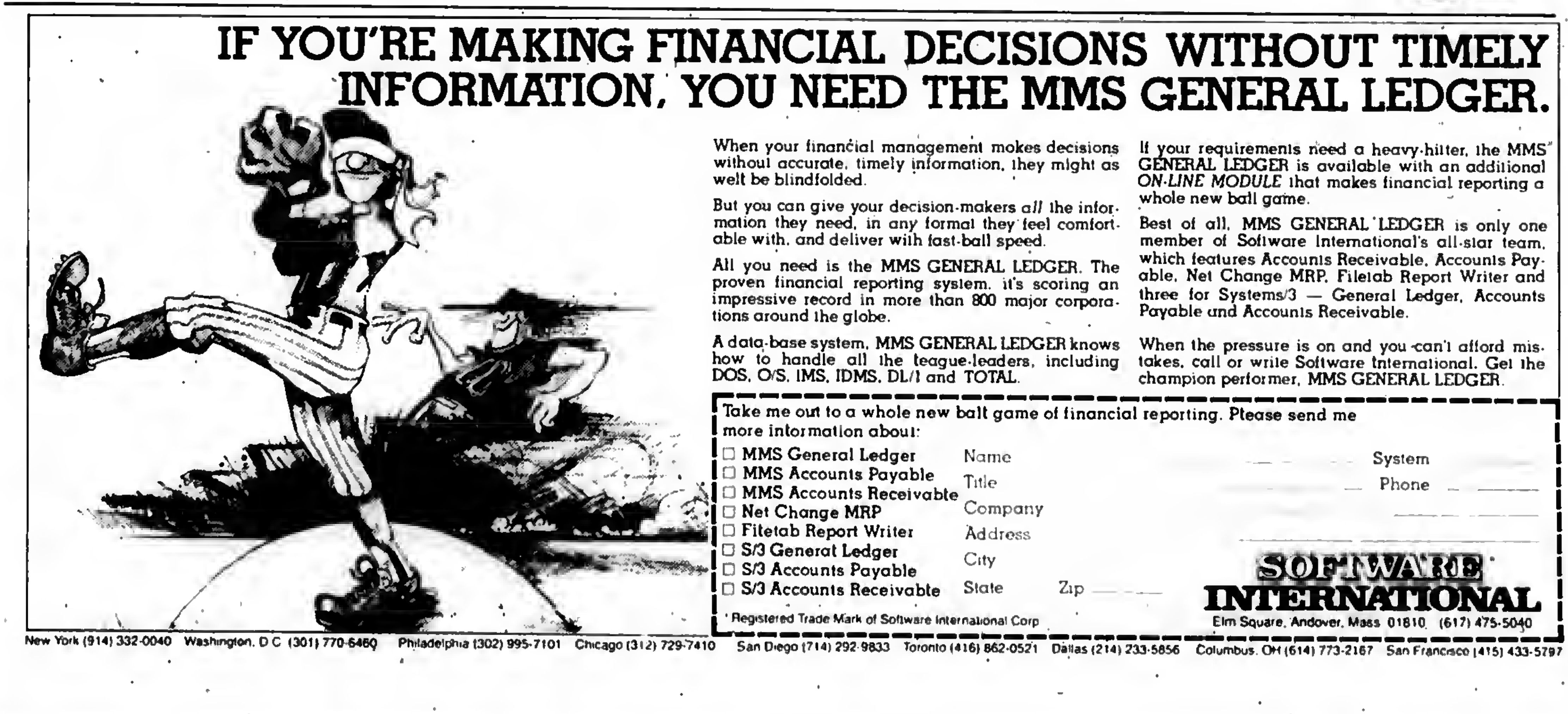
Package Eases Quick Chores

NATICK, Mass. — The Info-32 package from Henco, Inc. has been described by the vendor as a data entry/inquiry/report generator system based on a minicomputer. It enables users to conversationally gather, organize and maintain information, a spokesman explained.

The system supports the storage of both data files and processing routines, either of which can be accessed by name. Once in use, the data can be refined through selection criteria and the processing can be modified to meet new needs, letting the user work with what he wants, the spokesman added.

Written principally in Fortran, the system has been implemented on Honeywell Level 6 and Interdata minicomputers and on an Amdahl mainframe, according to the company.

Info-32 is available for a one-time cost of $4,000, or for $1,500 plus $150/mo for 24 months, Henco said from 215 Oak St., Natick, Mass. 01760..



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IN SYSTEMS-HOUSES

'Roscoe' Update Adds Vtam And Basic Compiler Option

PRINCETON, N.J. — Version 4 of Roscoe, the conversational remote job entry software from Applied Data Research, Inc. (ADR), is said to include more editing commands, Vtam support for IBM 3270s, closer links with ADR's Librarian and, for an extra fee, a Basic compiler.

The package provides program preparation, testing and maintenance services to personnel working at remote terminals operating under IBM's OS and OS/VS environments. These services include data entry and editing, library storage, syntax checking, job submission and output retrieval, programmed prompting and job stream generation, ADR said.

Changes in the logic of the Active Work Space (AWS) or interactive editing area not only support the new edit commands, but also reduce I/O and increase flexibility in the number of lines that can be manipulated concurrently, a spokesman claimed.

The Vtam support for 3270s includes local linkage, Bisynchronous and Synchronous Data Link Control (SDLC) protocols, the company said.

The Immediate-Update Librarian feature is said to support maintenance of Librarian master files from within the Roscoe region or partition. Described as a reentrant subset of the Librarian package, it is loaded under Roscoe command control and supports "all common Librarian functions," the spokesman stated.

The Minibasic special option is a "code-and-go" implementation of Dartmouth Basic which runs as a Roscoe monitor routine.

Programs best suited to Minibasic are those whose processing is mainly conversational with I/O generally restricted to working with the terminal, according to ADR.

Version 4 of Roscoe is available for a one-time cost of $28,000. Minibasic costs an additional $4,500 under the same arrangements. Each is also available under rental or lease plans.

ADR is at Rt. 206 Center, Princeton, N.J. 08540.

Tymshare Adds Personnel Runs

CUPERTINO, Calif. — The Personnel Evaluation and Reporting System (Pers) on the Tymshare, Inc. remote computing network can help personnel analysts and management run a company's Affirmative Action program and produce reports required by federal authorities, Tymshare said.

Pers accepts a firm's Affirmative Action data in raw form and transforms it into standard Equal Employment Opportunity Commission (EEOC) information reports. Other available reports include detailed rosters for internal monitoring and updating, a spokesman added.

But Pers is more than a compliance tool, he said, claiming it provides accurate, timely reporting and analysis to enhance management control of human resources and to increase staff productivity with minimal clerical effort.

The system enables users to access census data and data bases on industry salary levels. In addition, the network has personnel consultants available to help users structure and perform analyses and interpret data, the spokesman noted.

Tymshare's nationwide network is based at 20705 Valley Green Drive, Cupertino, Calif. 95014.

Cosmic 'Pert Time' Runs on CDC CPU

ATHENS, Ga. — Pert Time III, now available from Cosmic, is a program evaluation review technique (Pert) system for Control Data Corp. 6000 CPUs that monitors and schedules various activities within a particular project through use of a time-oriented network structure.

The package accepts data from cards, tape or data cell and produces 21 fixed reports and as many as 20 variable reports, schedule and resource plots and an updated activity tape or data cell, according to a Cosmic spokesman.

Formally cataloged as LAR-11887/-CW, the package requires 52K octal plus 1K octal for each 230 activities or events. It operates in batch mode, has a plotting option using a California Computer Products, Inc. plotter, is distributed on NOS internal format tape and costs $930.

Cosmic is at 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

Project Control System Revised

LOS ANGELES — J. Toellner & Associates has introduced an enhanced version of its Spectrum-2 multivolume set of project management and documentation guidelines for DP shops with modestly sized staffs.

The update includes all required standards, forms and procedures for the development of new systems and the maintenance of existing ones, a spokeswoman claimed. The estimating guidelines for large and small projects, originally published in Toellner's Spectrum-1 series for large staffs, are included in this version of Spectrum-2, she said.

Spectrum-1 is a 20-volume set of loose-leaf books, each focusing on the needs of a particular position or function within an organization. Spectrum-2 is smaller in scope, with material from Spectrum-1 compressed or eliminated to make the series more appropriate to the smaller staff, she explained.

Spectrum-1 support includes 150 hours of consulting work; Spectrum-2 provides 40 hours of implementation assistance to train the user staff, set up management priority committees, alter the procedures to local conventions and get the first few projects going.

Spectrum-2 costs vary with the size of the user staff. The system is available beginning at $10,000 (for staffs up to 10 in number) to $22,000 (for groups of 20 to 25), she said from 4311 Wilshire Blvd., Los Angeles, Calif. 90010.

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Modeling System Leads to Savings Formula

BIRMINGHAM, Ala. — Today's business environment is just too complex to base million-dollar decisions on gut-level feelings. Each year more and more variable, often uncontrollable conditions cloud management's view of where a company is today and where it's heading.

Today, many decision makers use a modeling program as a tool to weight alternatives and meet these challenges.

One such example can be seen at Vulcan Materials Chemicals Divison, a relatively young member of the parent Vulcan Materials Co., headquartered here, and one of the nation's leading producers of industrial chemicals.

The division, which markets a diversified line of chlorinated solvents, including carbon tetrachloride, chloroform and perchloroethane, accounted for almost two-thirds — nearly $35 million — of total company earnings last year.

Remote Service

As part of its effort to continue this success, the division is now using the Mathematical Programming System (MPS), a modeling capability on the General Electric remote computing network, to examine alternatives for day-to-day decisions as well as long-range planning.

"The chemicals industry is dynamic and highly competitive," according to Ray Heyd, manager of marketing research and the man responsible for the divison's use of MPS. "Today's decisions may have a dramatic effect on tomorrow's business climate, even to the point of survival."

This is particularly true of Vulcan's primary product line, the so-called commodity chemicals used in the cleaning of metals and textiles and as intermediate chemicals in the manufacture of other products.

"Commodity chemicals are generally high-volume and low-margin types of products, Heyd said. "But we feel our modeing capabilities give the division an added edge against competition."

Vulcan's success-oriented management guides the operations of chemical plants in Wichita, Kan., Denver City, Texas, and Geismar, La. Although only about 15% of its modeling system is completed, manufacturing process changes tested by the system have helped establish a trend toward increased profits, Heyd said.

Charles E. Sturgeon, vice-president of manufacturing for the division, noted "a method for increasing profits by more than $6,000 a day has been analyzed and put into operation at our Wichita plant. While we regard this as a great success, the net effect in terms of increased efficiency and profits at other plants could be even more significant."

Such a dramatic increase in plant profitability as a result of manufacturing process changes was, according to Heyd, "something Sturgeon had a feel for from the beginning, but modeling allowed us to test his idea for a matter of dollars rather than the large capital investment necessary for plant modifications."

Optimistic About Future

Heyd is optimistic about future successes. "We've really only scratched the surface," he said. "We have many other plants which can be modeled just as in Wichita with similar results."

Sturgeon also sees the system as a boon to the division's business. "We've involved in a number of very important 'what-if' games that hinge on our ability to discern the best possible alternatives," he said. "Ultimately, our models will be used throughout the division, providing us with an integrated optimization planning system of almost unlimited potential."

In addition to modeling production processes, Vulcan

(Continued on Page 19)

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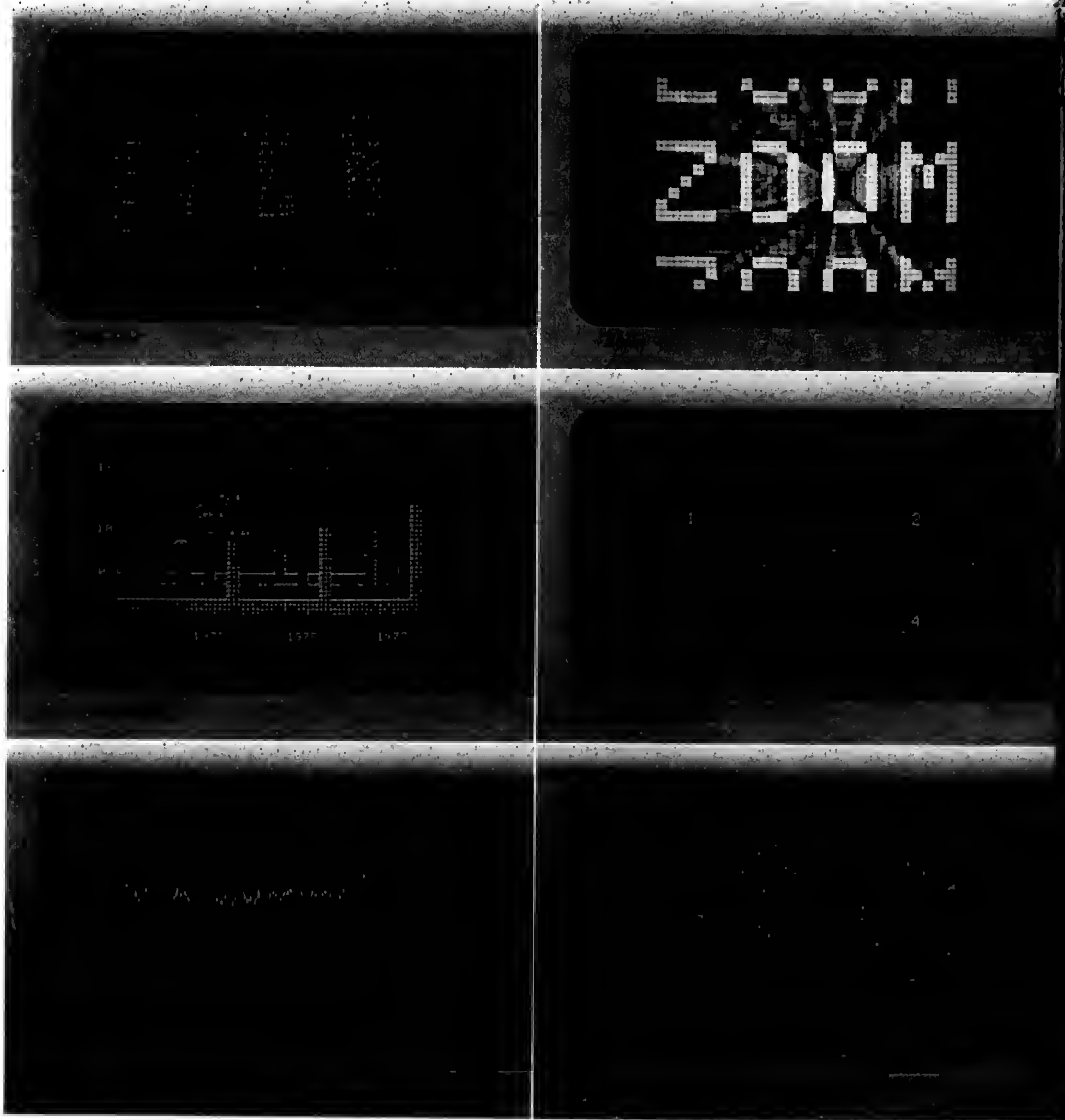
Hewlett-Packard brings a bright new look to low-cost graphics.



'Vserv' Maps DOS Disks

COSTA MESA, Calif. — Keyed to IBM DOS and DOS1-VS installations, the Vserv package scans volume tables of contents (Vtoc) to allow more efficient space allocation and support a "definitive" management of direct access storage devices, according to its vendor, Management Systems Co. (MSC).

The software solves disk management problems by providing a "comprehensive" device mapping facility and Vtoc access capabilities, according to a spokesman. The options allow the user to identify wasted disk space.

Vserv consists of a 15K program and a B transient, distributed on magnetic tape. A user guide is "self-generated" by the Genserv macro included in this $400 package, MSC said from 3185-D Airway Ave., Costa Mesa, Calif. 92626.

A Model Approach

Planning System Brings Savings

(Continued from Page 18)

hopes to also examine plant expansion alternatives with the system, Heyd said.

"The expense of building a new plant vs. adding facilities to an established plant can be measured by mathematical simulation on the system at minimal cost," he said. "Of course, this becomes a particularly important capability with escalating construction costs."

Also of concern for Vulcan is the effect of increasingly stringent environmental controls. Here, the ability to analyze and quickly adjust to changing environmental factors is critical, Heyd explained, giving as an example the uncertain future of fluorocarbons in aerosol use, which could affect the production of several of Vulcan's products.

Another area which benefits from Vulcan's far-reaching system is the choice of raw material feed stocks used in manufacturing chemicals. "Our model can now help us determine where we can get the best buy for our investment," Heyd said, "and the result is the optimal choice of feed stocks."

Vulcan's modeling system will continue to expand, according to Heyd. Scheduled for operation in the near future is a transportation matrix which will further enhance the division's efficiency and profit potential.

"Basically, the transportation matrix will allow us additional input in determining the manufacturing of shipping points for a certain chemical depending upon the location of the user. That way, transportation costs can be significantly reduced while at the same time increasing our ability to quickly serve customers," Heyd noted.

Vulcan management decided on the Mark III service after studying a variety of available processing alternatives, Heyd said. "Even our in-house processing could not match GE's economy of use."

Cassette Course Links DP, Audits

WOODLAND HILLS, Calif. — An integrated DP and audit control approach is said to be the backbone of the Auditable Internal Control Systems (Audics) audio cassette training program from Info 3.

The package is aimed at management, financial staffs, DP users, auditors and DP professionals. It shows each of these groups the needs of the others, the vendor said.

More information about the 12-booklet/10-audio cassette course is available from Info 3, 21241 Ventura Blvd., Woodland Hills, Calif. 91364.

The new Hewlett-Packard Graphics Terminal uses a microprocessor and raster scan technology to combine high performance with low cost.

The HP 2648A introduces a whole range of bright ideas to graphics. There's so much power built into the terminal itself that you can perform everything from auto-plots to zoom without any CPU help at all.

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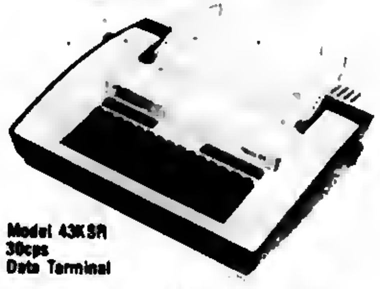

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Data Briefs

SBS Earth Station Set For Third IBM Site

McLEAN, Va. — Satellite Business Systems (SBS) has applied to the Federal Communications Commission (FCC) to construct an earth station on IBM premises at Research Triangle Park, N.C.

When completed in mid-November, it will be the third earth station in the preoperational program of SBS, which is an IBM, Comsat General Corp. and Aetna Casualty and Surety Co. joint venture.

Along with existing SBS earth stations at IBM sites in Poughkeepsie, N.Y., and Los Gatos, Calif., the station near Raleigh, N.C., will be used for common carrier, private line, voice and high-speed data communications services to IBM, according to an SBS spokesman at headquarters here.

SBS plans to begin the common carrier services to IBM by the beginning of next year. The preoperational program is a prelude to the carrier's full operational system of satellites and earth stations, scheduled for completion by late 1980, SBS stated.

Centronics Adds APL Set

HUDSON, N.H. — Centronics Data Computer Corp. has added an AL character set and engraved APL keyboard option for its Model 761 keyboard send/receive and receive-only teleprinters.

The option features a nine-pin print head that produces 7 by 9 dot-matrix characters with underscore and ascenders and descenders on the primary Ascii character set, according to a spokesman.

The APL option adds $450 to the price of a Model 761, he said from Hudson, N.H. 03051.

Omnitec Adds Acoustic Coupler

PHOENIX — Omnitec Data Corp. has added the Model 401D acoustic coupler to its acoustic coupler and modem product line.

The 401D can transmit at 450 bit/sec and optionally at 600 bit/sec. It has RS-232 and current-loop line interfaces in one connector; half- and full-duplex transmission capabilities are shown by indicator lights, Omnitec stated.

The coupler sells for $320, the company said from 2405 S. 20th St., Phoenix, Ariz. 85034.

Survey Finds Users Like Private Facilities Best

By John P. Hebert
CW Staff

DELRAN, N.J. — Although data communications users' first love is privately built facilities, users of both Western Union International (WUI) and MCI Telecommunications Corp. services said those facilities were almost as good overall.

According to a recent Datapro Research Corp. survey report called "All About Data Communications Facilities," the WUI and MCI user ratings came within small fractions of a percentage point of each other and of privately built facilities on a four-point scale in the categories of installation ease, operational reliability and promptness of repair.

The results on user experience are contained in the 29-page report, which also describes and analyzes the communications services supplied by the telephone companies and other common carriers.

The survey of communications users drew 809 usable responses reflecting experience with more than 10,000 communications links over an aggregate network of two million miles, according to the research firm.

User responses were assigned numerical equivalents for ratings from poor (1) to excellent (4) and were converted to weighted averages for all users of each carrier or facility type.

Reliability of Operation

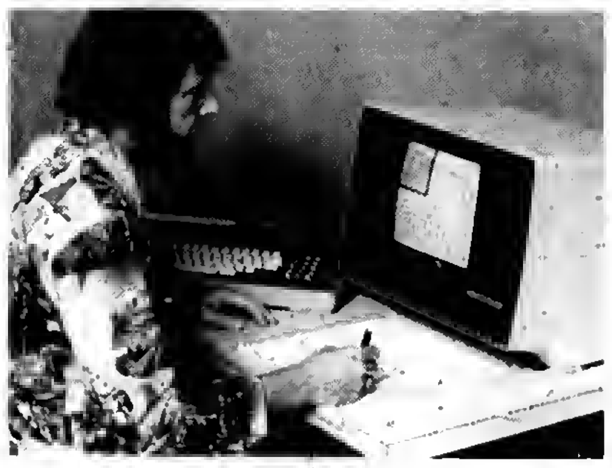
Grouped together, the specialized common carriers were rated as good as the Bell System in the category of reliability of operation (3.1), although WUI and privately built facilities gathered most points from users with ratings of 3.4 and 3.5 respectively, ac-

(Continued on Page 23)

Nugraphics Raster Scan CRT Touted as Tektronix Alternative

SANTA CLARA, Calif. — Nugraphics has unveiled the Cluster 1000 CRT graphics display terminal, designed as a raster scan technology alternative to the storage display terminals made by Tektronix, Inc.

The CRT presently can be used with the Data General Corp. Nova 2 CPU, Nugraphics stated.



Cluster 1000 With Optional Tablet

The Cluster 1000 uses 1M bit of random-access memory in an Intel Corp. 8080 microprocessor to refresh its digital CRT display at 60 Hz, according to a spokesman.

The basic terminal includes an IBM 2741-type keyboard with 20 function keys for cursor, picture and other control functions; the CRT; and an RS-232 interface.

The 416 by 312 picture element image is treated as a movable camera, viewing the 1K by 1K-bit picture data base. As such, the spokesman explained, only initial picture loading and permanent changes require attention from the host CPU.

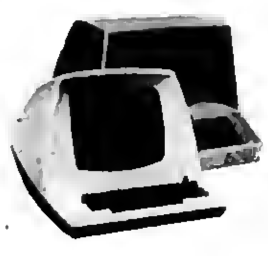
The graphics terminal features local implementation of panning, zooming from 1X to 8X, multiple split screens, write-through and background grids, Nugraphics stated.

In addition, up to 16 Cluster 1000s can share a parallel port on one host CPU with the addition of an optional interface.

The Cluster 1000s are capable of bidirectional data transfer through the parallel interface data channel at speeds of 66.6 kbyte/sec or higher, Nugraphics claimed.

Each of the terminals internally buffer 512 bytes of data for efficient use of the data

(Continued on Page 23)



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USTS Files Tariff Changes To Alter Private Line Rates

NEW YORK – U.S. Transmission Systems, Inc. (USTS), a subsidiary of ITT Corp., has filed changes to its tariff with the Federal Communications Commission (FCC) to modify its rate structure for single- and multiple-channel private line service.

The changes are scheduled to be effective Sept. 25, USTS said.

Generally, the rate change will increase rates for short-haul traffic and decrease rates for long-haul traffic. Approximately 65% of USTS customers will receive a rate hike while 35% of the customers will experience decreases, the company said.

Special features of the revised tariff include the addition of three discount mileage rate bands, the incorporation of the channel termination charge into the line haul rate and the elimination of the distinction between two-wire and four-wire local distribution channels, according to the carrier.

The rate changes are expected to increase revenues by approximately 4%, based on the current customer mix.

The line haul rates in the revised tariff utilize eight mileage rate bands and offer customers a range of prices from a $5.90/mile rate for circuits up to 10 miles in length to a flat rate of $770 plus 38 cent/mile for each mile over 1,250.

The change also will reduce the number of multiple channel discount categories from eight to five offering variations at 12-channel intervals beginning at 24 channels and ending at 60 channels, USTS added.

USTS is located at 67 Broad St., N.Y., N.Y. 10004.

RFL Card Aids Remote Tests

BOONTON, N.J. – RFL Industries, Inc. has a loopback circuit card designed to test remote modems and communications lines from a master station.

The 68 Loopback Card operates in conjunction with RFL's Model 6850 and 6385 FSK tone equipment to loop back the digital interface or the communications line at a remote location, according to the firm.

Supervision of the loop back functions is accomplished at the master station by manual or computer-controlled switching, RFL stated.

The 68 Loopback Card can be equipped with TTL, CMOS, MIL, CCITT or EIA interfaces and costs $170 from the firm at Powerville Road, Boonton, N.J. 07005.

Modem Replaces Vadic 3400

PALO ALTO, Calif. – Prentice Corp. has unveiled a two-wire, half- or full-duplex 1,200 bit/sec modem designed to save users money by reducing on-line computer time.

The modem is a cost-effective alternative to the Vadic Corp. 3400, according to Prentice.

Buffered Version

The P-1200-Plus is a buffered version of Prentice's Model 1200/150 modem. Buffering allows simulated 1,200 bit/sec full-duplex transmission over dial-up or two-wire leased lines, according to a spokesman. The unit interfaces with keyboard send/receive KSR types of data entry keyboards in an echoplex environment.

Available in both answer and originate versions, the P-1200-Plus is geared for varying line conditions and replaces existing Bell 103-type modems in higher data rate, interactive applications, the spokesman stated.

The modem operates in any system interfaced with a manual or automatic Data Access Arrangement (DAA) and connects with standard EIA RS-232 or Teletype Corp. compatible adapters.

The price of either version of the P-1200-Plus is $560 from Prentice at 795 San Antonio Road, Palo Alto, Calif. 94303.

Teleray Unit Uses Minidisk

MINNEAPOLIS - Research, Inc.'s Teleray Division has introduced an ASCII floppy disk terminal that uses 5-1/4-in. minidisks for storage and fast random-access retrieval of data, the firm said.

Designated the Model 2020 Teledisk, this unit will store and transmit the equivalent of 37 CRT screens of data (71.68K characters) or 13.5 pages of 8.5 by 11-in. printed material, it added.

Teledisk has two RS-232 interfaces for attachment to any asynchronous Ascli terminal and modem, the company noted.

The 2020 can be operated in read, write, find, insert, erase and address modes with operator prompting; it is compatible with Bell 103, 113 and 202 modems, the firm added.

The unit costs $1,750 from Research at P.O. Box 24064, Minneapolis, Minn. 55424.

Users Like Private Facilities, Datapro Finds

(Continued from Page 21)

cording to Datapro.

Western Union (not WUI) trailed in the reliability category with a rating of 2.7, and the other telephone companies received an overall rating of 2.4.

The 29 users of private facilities said those networks were relatively easy to install (3.4), while the 563 Bell System users gave their facilities' installation a 3.1.

The specialized carriers garnered a 2.9 from their 34 users; Western Union received a 2.7 from 31 users, and the 102 respondents using the other telephone companies' services rated those facilities' installation 2.4.

In terms of repair promptness ("quickness to troubleshoot and correct problems"), the privately built facilities were again given the best rating (3). Specialized carriers took second place with a 2.8, followed by Bell with a 2.7.

User ratings of satellite channels, Canadian facilities and European facilities were also included in the survey results.

Taking the average of weighted averages in all three rating categories, the privately built facilities came out ahead with a score of 3.3. WUI followed with a 3.27 rating, and MCI brought up the rear of the top three with a 3.2.

AT&T's rating from users of its various services was 2.97 in all three categories; satellite channels were next with a 2.93 overall; Southern Pacific Communications Co. received a 2.9 overall; and other specialized carriers had a 2.7.

Western Union was given a 2.63, European facilities a 2.46; Canadian offerings a 2.43; and telephone companies other than the Bell System received the poorest rating overall in all three categories with a 2.33.

Ratings By Services

It is difficult, however, to compare one vendor's offering with those of others, because all are different in at least some ways.

Because of this, Datapro broke out users' ratings for each vendor and types of services offered by each. Bell, for example, was broken down into six different types of facilities or offerings and private facilities were broken down into four separate categories.

In addition, the report also lists all vendors' facilities, rates and service areas grouped in terms of facility type.

Datapro found some usage patterns have changed since the last survey was conducted one year ago. Among those findings: more users are turning to front-end processors to offload the communications functions from the mainframe; and more are employing transmission speeds of 4,800- and 9,600 bit/sec.

"All About Data Communications Facilities" is available for $12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Nugraphics Has Raster CRT

(Continued from page 21)

channel in a burst mode, it added.

The RS-232 interface allows communications with the host at speeds up to 9,600 bit/sec under direct memory access through network links, the spokesman noted.

The Cluster 1000 can pan or zoom and add or erase a single item to or from the picture and display and change messages from the host CPU with built-in hardware, according to the firm.

In contrast, the Tektronix 4014 requires a picture redraw to achieve these functions, Nugraphics said.

The Cluster's display tube costs about $100 to replace, while the 4014 storage tube replacement cost is about $2,000, the vendor claimed.

Messages and message changes are displayed on the Cluster monitor through its split-screen technique and reportedly do not interfere with the stored picture or require redrawing.

The terminal also offers six different arrangements of split screens containing up to three split areas per screen. The feature, according to the firm, provides for simultaneous display of messages and graphics or of a picture with a zoomed close-up. There is no comparable 4014 feature, Nugraphics claimed.

Cluster Prices

The basic Cluster 1000 is priced at $14,990. A Summagraphics Corp. adapter costing $2,000 facilitates parallel communications to the Nova CPU and also allows up to 16 Cluster 1000s to be daisy chained to one host CPU port, according to the spokesman.

An optional operator station tablet is priced at $3,950. Nugraphics is developing an interface for the Digital Equipment Corp. PDP-11 minicomputer, the spokesman noted from the firm at 3012A Scott Blvd., Santa Clara, Calif. 95050.

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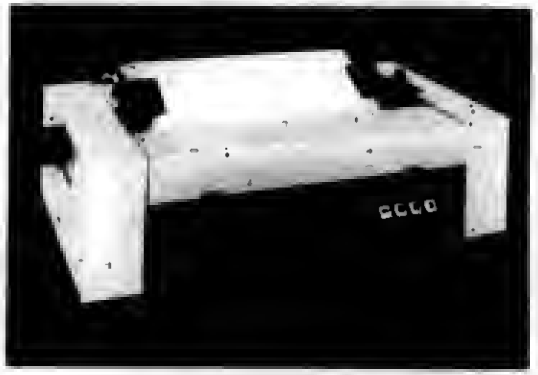

The reason is very straightforward. Hydra Ballistic™ matrix printers were designed, right from the beginning, to be fully adaptable to all the varying aspects of communication networks, whether IBM, Univac, Burroughs, Honeywell, or others. Even one of your own design. Consider too that Hydra's staff probably knows more about communication networks than any other manufacturer of printers. Taken together, an excellent combination.

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MDS Units Increase Distributed Options

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has added six products for use with its Series 21 product line for distributed data processing applications.

The Series 21 products introduced include:

- An MDS-compatible channel (Feature 180) for linking Series 21 systems directly to other MDS systems.
- The Model 2142-1 printer for 90- to 240 line/min operation.
- The Model 2142-2 printer for 230- to 340 line/min operation.
- The Model 2145 printer for 600 line/min operation.
- The Model 2481 tape drive for 9-track, 800 bit/in. operation.
- The Model 2482 tape drive for 9-track, 1,600 bit/in. operation.

The three higher speed printers will give Series 21 users increased printing flexibility over the current 45 char./sec printer, according to a spokesman. The print speeds on the latest MDS offerings are based on the number of characters printed on each line, as opposed to the number of print positions, he said.

The availabilty of a magnetic tape drive for the system provides Series 21 users with a means of converting diskette records to a CPU-compatible magnetic tape. Auxiliary storage is also provided, the MDS spokesman said.

The MDS-compatible channel allows Series 21 systems to interface directly with larger MDS 1200, 2300 and 2400 systems. This gives users expanded capabilities and the necessary elements for a distributed processing network, he claimed.

The printers range in price from $155/mo for Model 2142-1 and $220/mo for a Model 2142-2 to $440/mo for Model 2145. The Model 2481 tape drive with controller rents for $154/mo; the Model 2482 rents for $212/mo. The MDS-compatible channel costs $18/mo.

All prices are based on a three-year rental contract excluding maintenance, the spokesman noted from 1599 Littleton Road, Parsippany, N.J. 07054.

Bits & Pieces

Forms Burster Boasts Unattended Operation

DAYTON, Ohio — The Standard Register Co. has introduced the Packmaster, a self-powered, relatively high capacity forms stacker. The unit is designed to be part of Standards' Series 1500 forms bursters.

The Packmaster, when used with a Series 1500 burster, permits unattended operation with automatic shut off and preselected forms pack heights up to 15 in., according to a spokesman.

The unit will accommodate one- or two-wide documents in lengths from 3- to 14 in. and widths between 4-1/4- and 19-1/4 in.

The unit sells for $1,310 for factory installation, with field installation costing an additional $96. Standard can be reached at P.O. Box 1167, Dayton, Ohio 45401.

Plotter Controller Bows

HOUSTON — Logic Sciences, Inc. has introduced the MPC-11, a microprocessor-based plotter controller that reportedly allows users to off-load plotter software from host systems.

The unit costs $3,500 with quantity and OEM pricing available from the firm at Suite 412, 6440 Hillcroft, Houston, Texas 77081.

Unit Tests 2314 Types

FULLERTON, Calif. — A device that provides disk pack and disk drive testing on IBM 2314-type disk drives is available from Wilson Laboratories, Inc.

Functions include restore, switch seek, seek incrementing, decrement seek and random patterns of incrementing, according to a spokesman.

The DX-2314 is equipped with 16 bits of error counting with overflow and has a stop-on-error control. The unit sells for $1,995 from the firm at 2536 E. Fender Ave., Fullerton, Calif. 92631.

Tag-Processing Operation Helps Provide Timely Fashion Reports

DALLAS — Neiman-Marcus, known for a unique Christmas catalog and its reputation as a prestigious specialty store, recently implemented a comprehensive merchandising system.

The Fashion Merchandising Management (Famm) system provides fashion-merchandise decision makers at all eight Neiman-Marcus stores with timely information, a spokesman said. Reports provide complete stock status, sales and inventory information by class, style, vendor and other categories.

The majority of information required to produce Famm reports originates in the selling department. Buyers provide the remainder of information required for Famm reports when writing purchase orders and completing price change worksheets.

"There are basically two types of information originating in the selling department — Dennison Corp. merchandise tags and hand-written media," according to Larry Arcury, DP operations manager. All items classified as fashion merchandise have multipart Dennison tags. A tag is detached for each item received into the department, sold to a customer or returned by a customer.

Each type of tag has its own transaction code and need not be kept separate. Tags are spindled in each department and forwarded to Neiman-Marcus' DP center here at the close of each business day.

Rejects Processed

The tags are scanned on a Cummins-Allison Corp. Keyscan system the following day. Data read from the tags is stored on disk. Tags with unreadable characters are rejected into a separate stacker.

An operator processes the rejects at one of Keyscan's CRT/keystations by entering the unscannable characters only. Mutilated tags and handwritten media representing miscellaneous transactions are also key-entered via a CRT/keystation.

Data is transferred from disk to magnetic tape at the end of each day. The data is then transmitted to an IBM 370/158 at the corporate data center in California. Famm processing is completed overnight and reports are generated on a remote printer here.

The Famm system was implemented gradually by Neiman-Marcus beginning in the spring of 1976. "Prior to converting to the new system, we had been using a Cummins-Allison scanner interfaced to an IBM card punch," Arcury said. "While that system worked well for us, we foresaw a change in our requirements in the not-too-distant future that would require us to develop a system with greater efficiency and the ability to process increased volume."

A Cummins-Allison Keyscan system was selected for two basic reasons, he said. First, Neiman-Marcus was familiar with Cummins-Allison equipment since it was part of the existing system.

Secondly, Arcury said, Keyscan provided the speed to process substantially higher volumes and the flexibility to process transactions from both the existing system and the Famm system on an intermixed basis.

"We began our conversion process in May 1976," he recalled. "That process involved eight stores — two here and other stores in Fort Worth, Houston, Atlanta, Bal Harbor; Fla., St. Louis and Northbrook, Ill."

The conversion was completed in November, and it involved 78 departments and more than 1.5 million items. "We beat our timetable for the conversion by nearly six months," Arcury said.

The system includes a 64K-byte processor; a 2.45M-byte disk drive; a 9-channel, 800 bit/in. tape drive; two CRT/keystations; and a tag scanner.

"The system has worked exceptionally well for us," Arcury said. "Our volume has increased by 5%, but we achieve our desired turnaround time and we have only one person working the Keyscan system where our former system required a full-time staff of two.

"In addition, our downtime is less than 2%, and that's a critical factor since our tag-processing volume has increased substantially."

Ticket testing procedures are an important part of the Famm system. Test tickets are produced twice daily on each of the Dennison print/punch machines. These tickets are scanned on the Keyscan to verify accuracy and detect improper punching.

This process immediately identifies problems in the tag-printing operation and assures that accurate, scannable tags are affixed to all merchandise, Arcury explained.

Tape-to-Print System Offered

MELBOURNE, Fla. — Documation, Inc., said it is offering higher levels of off-line impact printing capability with its DOC-TPS tape-to-print system.

Up to four of Documation's line printers can be configured into a system to provide print speeds ranging from 1,250- to 9,000 line/min on a single system. The DOC-TPS operates with one to four industry-compatible tape drives with one central controller, according to a Documation spokesman.

Features of the system include IBM, Burroughs and Honeywell tape compatibility, top-of-form restart and form and line count for job-accounting records.

Twelve different configurations are available with lease rates ranging from approximately $2,600- to $9,573/mo. Documation can be reached at P.O. Box 1240, Melbourne, Fla. 32901.

Merged Technologies — Part 2

Three Alternatives Join COM, On-Line System

By William J. McCullough
Special to CW

There are a variety of alternatives for using computer output microfilm (COM) and on-line systems in conjunction with one another to meet the requirements of a given information system. The best way to determine which alternative to use is to clearly define the requirements of the system and what your organization is willing to pay for it.

The first alternative would be to maintain on-line only the most current or critical information from a data base and put the entire data base on a COM file. Defining current or critical data is a management decision and is dependent on the requirements of the particular system.

An index to all items in the data base would be maintained on-line for rapid access to detail information in the COM file.

This is the second article in a three-part series that looks at the integration of on-line and COM systems by William McCullough, national sales manager for U.S. Datacorp, a COM service organization.

The advantages to this alternative are as follows:

- The COM file would provide backup to the on-line system in the event of computer failure.
- The on-line update capability is maintained.
- The amount of mass storage required for the data base could be reduced substantially, thereby reducing costs.
- Index sequential software, if used for creating the COM file and index, could provide an audit trail on all file activity.

A possible disadvantage to this alternative might be that file inquiry could require two steps.

The next alternative would be to put the entire data base on COM and maintain only the index to the COM file on-line. Retaining the on-line update capability may be a requirement of the system.

The COM file and index could be updated on a daily basis provided you were using a COM service bureau that could provide overnight turnaround or had an in-house COM system.

The advantages of this alternative are the same as those outlined previously, with the added savings in mass storage space.

A third alternative takes us back to the initial planning for the system. After the requirements of the system have been defined and weighed against the cost of an on-line system, does the date base have to be on-line at all?

If the system does not require an on-line update capability, could a current COM system meet the retrieval and display requirements of the proposed system?

If it could, then the third alternative would be a COM system with daily updates.

The primary advantage of a COM-only system would be a dramatic reduction in the time and funds required to implement the system. If the data base already exists, the COM software could be implemented in less than a month, in most cases.

The disadvantage to this alternative would be the absence of an on-line file update at the point of need.

When we discuss distribution relative to on-line systems, we could be talking about one of two things — first, the actual transmission of data to the requesting terminal(s); second, a possible hard-copy follow-up sent via normal channels, e.g. mail, messenger or transmission.

Remote batch work falls into the latter category, even though it is the primary output, simply because it typically means paper, even though it is dependent upon transmission.

Let's look at them one at a time from a pro and con viewpoint.

Data transmission is such an integral part of so many businesses that they would be lost without it. The speed with which these systems function usually pleases us, as customers, very much.

How do you argue with a computer that is hundreds or thousands of miles away? You don't. But if you could see the files being referenced, you could tolerate the waiting time.

How about the paper output of on-line systems? Is it really cost-effective to use a remote batch terminal to print reports which must then go the traditional route of reproduction and distribution? Or to supply hard copies of the data in the on-line files for those "down" times?

The answer to both questions is "certainly not," especially if you were to compute the cost per character to deliver the data to the end user. It is this facet of on-line systems that makes systems analysts look for alternative methods of information dissemination.

Used in conjunction with an on-line system, COM can play a significant role in the distribution of information.

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Mini Duet Solves Order Entry Problem

By Ann Dooley
CW Staff

SANFORD, Fla. — Harcar, a manufacturer of aluminum windows, doors, bathroom enclosures and related products here, has solved a complicated order entry, inventory and production problem by using two minicomputers.

The system, called Matrix IV, was designed by Technology Applications Laboratory (TAL) of Satellite Beach, Fla. With the two Hewlett-Packard 21MX minicomputers, Harcar can simultaneously enter a customer's order into the data base to all the business functions without reentry, according to an HP spokesman.

Other manufacturers said such a system would require a minimum of 10 disks, but the work is being done on two, according to Carl Schilke, president of Harcar. They also said that even if it were possible, it couldn't be fully functional for nearly two years, Schilke added.

"In fact, the system is simplicity itself. Our employees are having no problems providing us with a tremendous amount of useful, detailed information," he said.

The other manufacturers also wanted to sell Harcar only packaged programs because customized programs would be too expensive. But "TAL was able to design programs for us exclusively," he said.

Previously, everything was handled manually or with the help of a calculator. In the last year and a half, however, Harcar's daily invoice mailing went from 40 to 200 and sales were expected to increase by $1 million each year for the next three years.

"I don't think we could have accommodated this kind of expansion without this system," Schilke said. "I think the paperwork would have been impossible for us to handle manually."

Harcar provides more than 50,000 options from six basic production lines with 168 standard sizes in each line. Component parts are cut from aluminum extrusions 18 to 24 feet long in mill and anodized and bronze finish.

As an order comes in, the customer's identification number is entered and an order form is displayed on a CRT showing any special shipping instructions, the customer's credit rating, the county where he is located and the Harcar salesman in charge of the account.

The shipping dates and products ordered by their parts number are filled in by an operator. A delivery date is assigned and a delivery ticket is printed; the ticket is sent to the shipping department until the order is ready to be shipped.

All the orders of similar products scheduled for the same shipping date are pulled from the data base by the computer operator at one time in order to produce the products. In other words, the system groups all bronze windows of a certain size together, Schilke explained.

This list is checked against the finished products inventory and the system determines what products need to be manufactured. The minicomputer then goes on to break down these items into their raw material components.

The computer is also programmed to pick out the most advantageous length of extrusion and size of glass for cutting. If the best

(Continued on Page 28)

The Turnkey — Part 3

Bottom Line: A Working System

By Vincent Deschamps
Special to CW

A proper implementation procedure will ensure a successful turnkey minicomputer system. Bear in mind the bottom line is that the system should work.

The vendor should be paid if the system works, but not until he can prove it will work.

A good deal on the wrong system is not a good deal.

Keep your system simple. Don't start with a system that is over-engineered or provides more power or capabilities that you may require in the next five years.

Base your decision on what you *want* the system to immediately do; what you *really need* the system to immediately do; and what you want your system to be able to do in three months, six months, one year and two years after installation.

The following are some recommended implementation procedures for turnkey systems to be stipulated by contract:

- Require a "no-obligation," preliminary sales proposal from the vendor.
- Based on the proposed system configuration of hardware and software, a deposit of more than 10% of the hardware and 40% of the software costs would be appropriate. The deposit should be returnable.
- Upon receipt of your deposit, obtain a commitment from the vendor to have one of his system analysts visit your offices to generate a *detailed* system definition. Allow 30 to 90 days for this analysis to be performed.
- Upon completion of the above analysis, a detailed system definition should be presented for your approval. If you do not approve it, your deposit must be returned and you should not be under further obligation to all vendors and lessors.

If you do approve the detailed systems definition, the vendor should begin programming the system and provide benchmarks and a timetable before the start of programming.

- Once the applications programs are completed, insist upon a systems test at the vendor's facilities, using sample test data

(Continued on Page 28)

Implementation Schedule

Function	Responsibility	Date
1. Financial & Technical Review	Hardware and Software	On Contract
2. Sales Agreement Signed	Customer	On Contract
3. A Deposit Check	Customer	Contract + 14 Days
4. Schedule Planning Meeting	Vendor and Customer	Contract + 60 Days
5. Detail the Specifications	Vendor and Customer	Contract + 75 Days
6. Prepare the Specifications	Vendor	Contract + 90 Days
7. Specification Approval	Customer	Contract + 180 Days
8. Write Application Programs	Vendor	Contract + 180 Days
9. System Demonstration at Vendor	Vendor and Customer	Contract + 180 Days
10. Application Program Acceptance	Customer	Contract + 225 Days
11. Operator Instruction and Documentation Preparation	Vendor	Contract + 225 Days
12. Delivery of Hardware	Vendor	Contract + 230 Days
13. System Installation & Diagnostic Test at Customer Site	Vendor and Customer	Contract + 230 Days
14. System Acceptance and Payment	Customer	Contract + 180 Through 225 Days
15. Preparation of Customer Data	Customer	
16. System Processing.	Customer	Contract + 230 or More Days

This timetable represents a viable schedule of performance by the vendor which the user can insist that he accept as a condition of the sale. Remember, however, that some slippage may occur because of the availability of the time by the user to work with the vendor.

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Outcome of Implementation a Working System

(Continued from Page 27)

supplied by you. This test will ensure that the system complies with the specifications that were agreed upon by you and the vendor prior to the programming phase.

- When you have accepted this test, the vendor should prepare operator instructions and documentation for your system. Give him 30 to 45 days to complete this phase. Once they are completed, the vendor should be ready to deliver your hardware.
- The hardware will be installed by maintenance personnel who should also perform diagnostic tests. The latter is a requirement to assure the hardware is functioning properly. Upon completion of the diagnostic tests and your acceptance, you should pay for the system. The vendor should then assist you in the conversion of your existing system or procedures to the newly installed system.
- During the programming stage, forms should be created to be used for preparation of your data as it needs to be converted from your present system to your new system.

An independent source of your choice may be used to convert this information to punched cards or magnetic tape. Either of these media can be loaded onto the system after delivery.

Leasing and Financial Services

While minicomputer systems invariably carry a lower price tag than larger or standard (e.g. IBM 360 series) systems, you should examine the advantages or disadvantages of purchase, lease, rental, financing or other payment plans.

Many minicomputer systems manufacturers do not offer a real leasing plan. As a result, the customer has to find a financing resource which may be a third-party leasing organization, a bank, etc.

There are three basic types of leasing which are available from a few vendors or distributors (most minicomputers usually fall into the first category):

- Financial leasing with full payout over three, four or five years.
- Operating leasing with less than full payment over 24 to 36 months.
- Tax-oriented leasing with effective interest cost. This is usually the best, if large dollars are involved, because it provides leverage for tax purposes and a lower interest rate to the user.

Leasing a system has numerous advantages over purchasing. Leasing does not impact existing bank credit lines and preserves cash because the money to buy is not needed out front.

A leased system can be represented on the balance sheet as a direct expense as opposed to a depreciable asset, which takes seven years to write off. Because the rate of interest a leasee pays remains constant, leasing can be viewed as a hedge against inflation.

Most manufacturers and their distributors provide their own full field service and maintenance contracts. In fact, they usually insist upon having their leased or rented equipment serviced only by their own organization.

Some manufacturers or distributors that have user installations at inconvenient or expensive-to-reach locations either arrange third-party field service or, because of the relative inaccessibility of the site, have to charge more.

This is the final article in a three-part series. Deschamps is president of Turnkey Sales and Leasing, Inc. in New York.

Mini Duo Solves Entry Problem

(Continued from Page 27)

size is unavailable, the next best is selected automatically.

Information about the excess material is stored, ready to be retreived the first time it can be used to fill an order, according to Schilke.

"This gives us tremendous raw material control," he noted. "We're able to locate the best available material quickly and use it with a minimum of waste."

After completing a production run, the system produces an efficiency report indicating the goods produced against the amount of labor required to produce them. In addition, it shows the exact costs of filling each order.

When an order is ready to be shipped, the operator calls the order form up on the CRT screen. If a back order is being filled, the operator fills in the quantity to be shipped and a back order report is prepared to indicate a completed order.

The Matrix IV system also produces management reports including a work order report listing orders by customer and showing daily receipt of new business; buy-out reports listing items on work orders which are nonstandard and need to be purchased; reports listing sales by salesman, county, state, customer and product; and a report listing the average discount given by product and salesman.

"With the two processors, we are achieving the kind of production and inventory control that major corporations have on a larger scale. And we are doing it with three employees who had never seen a computer in their lives until we got this system," Schilke said.

The second computer was added only recently because "we were having a problem scheduling different application work that needed to be done at the same time," according to Nina Pyle, Harcar DP manager.

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DL11 Replacement Offered

CANTON, Mass. — An asynchronous single-line interface series that replaces the Digital Equipment Corp. PDP-11 system's DL11 interface has been introduced by Gen/-Comp, Inc. here.

The series 2031 asynchronous line interface allows users to interface a CRT or Teletype at transmission rates from 75- to 9,600 bit/sec using a single interface card, the firm said.

The interfaces are software- and hardware-compatible with the PDP-11, the company claimed.

The 2031-01 costs $525 and the 2031-02 costs $575 from Gen/Com at 6 Algonquin Road, Canton, Mass. 02021.

Aviv Designs PDP-11 Tape Controller

BEDFORD, Mass. — Aviv Corp.'s Model TFC 802 embedded magnetic tape controller is said to be compatible with all Digital Equipment Corp. PDP-11 minicomputers.

The unit offers both NRZI and/or phase-encoded recording techniques for standard tape drives over a speed range of 12.5- through 125 in./sec, a spokesman said.

The package consists of three boards in a system unit with interconnecting cables to the PDP-11's Unibus and the tape drive. These units are compatible with DEC's RSX-11, RT-11 and disk operating systems, the firm added.

Complete diagnostic software which includes a subset of DEC diagnostics DZTMA Revision H, DZTMB, Revision B and DZTMG Revision C is supplied, the spokesman said.

The controller costs $3,600 from Aviv at 300 Sweetwater Ave., Bedford, Mass. 01730.

MPI Floppy Disk Drive Has Band-Driven Design

SEPULVEDA, Calif. — Micro Peripherals, Inc.'s (MPI) B82 floppy disk drive uses a band-driven design concept similar to that used by IBM for its drives, according to the vendor.

The B82 was designed for both mini- and microcomputer applications and uses standard 8-in. diskettes.

The drive offers up to 6.4M bits per disk for a single-density drive and up to 12.8M bits per disk for a double-density drive. Total storage capacity is 1.6M bytes on a diskette.

The unit's average access time is 91 msec and track-to-track access is 3 msec. Data is transferred at 250 kbit/-sec for single density and 500 kbit/sec for double density, according to MPI.

Both hard- and soft-sector format operation is accommodated. The drive will read or write an IBM-compatible floppy with the appropriate format, the vendor said.

The B82 costs $450; quantity discounts are available, MPI noted from 8724 Woodley, Sepulveda, Calif. 91343.

HIS Ruggedizing Level 6 Machines

WALTHAM, Mass. — Honeywell Information Systems, Inc. has announced ruggedized versions of its Level 6 minicomputers.

Designed for special factory, environmental and military applications, the minis will be available in the third quarter. The systems can be configured with either core or MOS memory, a spokeswoman noted.

A ruggedized 250-byte diskette unit and 240 line/min and 600 line/min printers will also be available for the system; additional rugged peripherals are expected by 1978, HIS said.

A typical system with the 6/36 processor and 16K of MOS memory with error detection and correction costs about $25,000.

Peripherals for synchronous and asynchronous communications lines as well as CRT or teleprinter consoles and up to 64K words of memory will be available, the spokeswoman said from 200 Smith St., Waltham, Mass. 02154.

Bytronix Controllers Fit DG, DCC Minis

FULLERTON, Calif. — Bytronix Corp. is offering two disk controllers, each contained on a single circuit board, for Data General Corp. and Digital Computer Controls, Inc. (DCC) computers.

The Model B234 controller requires one slot of the computer chassis and is both software- and media-compatible with the DG 4234 disk system. It can control up to four drives.

The B234 does not require wire wrapping, use of the external I/O bus connector or an external adapter.

The Model B446 controller is software — media- and pin-compatible with the DCC 116446 disk system and can be interchanged with DCC 116446 controller boards in existing systems, Bytronix said. The B446 will control one or two drives.

The price of either controller is $2,600, Bytronix said from 2751 E. Chapman Ave., Fullerton, Calif. 92631.

COMPUTERWORLD INDEX

SUBSCRIBE TO THE 1977 COMPUTERWORLD INDEX AND GET SIX MONTHS OF REFERENCE INFORMATION FREE.

The new Computerworld Index, published quarterly and cumulative, is an invaluable reference tool for organizations that have a need-to-know about what's going on in the computer world.

The first issue of the Index for example, covers the last six months of 1976, and it includes more than 4,000 entries by subject, author and name of any company mentioned. It breaks topics down into highly usable and convenient categories:

- There are entries by *product or service*, like *PRINTERS*, which has 37 entries in the six-month period covered; or *LEASING*, which has 10.
- There are entries by *industry*, like *INSURANCE*, under which there are 17 entries for various stories on the use of computers in the insurance industry.
- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory, security* and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- . . . and there are *others: KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries . . . and there's much, much more.

Company Names, for example, are a very important part of The Index. Looking under IBM, we find *ten* categories:

- IBM GENERAL
- IBM LITIGATION
- IBM SOFTWARE
- IBM SYSTEM 3
- IBM SYSTEM 7
- IBM HARDWARE
- IBM PRICING
- IBM POLICY
- IBM SERIES 1
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TI's new 765

Until now, a portable data terminal operated on-line with its computer via a telephone line.

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Add bubble memory and a terminal can remember while it waits to talk to your computer. That's the beauty of the new *Silent 700** Model 765 Portable Memory Terminal.

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Texas Instruments is the first company to put bubble memory in a form you can get your hands on.

The *Silent 700* Model 765 Portable Memory Terminal.

terminal mea

Taking to the air.

Minutes later he reaches the airport and boards his flight. His 765 terminal fits easily under his airline seat. With the revolutionary new dimension of bubble memory, he'll be able to enter and keep sales data without the added bulk and cost of cassette cartridges, floppy discs or paper tapes.

Third floor, sportswear.

Arriving at his first sales call, his memory terminal goes to work. Without connecting to a phone, he begins to enter his orders, prices and delivery commitments. He has at his fingertips a file management system and a powerful operator command mode that will let him easily select a communications mode, configure memory, and enter or edit his orders. And the story stays exciting to the close.

A last-minute change.

Later in his room, he reads back his sales entries, checks his inventory figures and edits a few changes on his hard copy record. Then he ponders the success and commissions of the day that have been stored up in the terminal's memory. The basic 765 terminal comes with 20K bytes of memory storage. And can be expanded to 80K bytes — the equivalent of 16 to 20 fully typed pages.

TEXAS INSTRUMENTS.

ns business.

Later that evening.
With his orders prepared and the phone rates down, he dials up his central computer at his warehouse. The stored data is transmitted at 30 characters per second. And his sales are rung up. Saving time. And saving money.

Small price for remembering.
TI's new 765 is priced at only \$2995†. Additional 20K increments of bubble memory storage are \$500 each. And, of course, quantity discounts and lease programs are also available.

Wrapping up the deal.
The next day, his customer's orders have been processed. And his first deliveries have been packaged for shipment.

TI's new 765 Terminal with bubble memory has sold a good salesman.

Ask TI how the new memory terminal can help your business. Return this coupon today for more information. Or call Terminals and Peripherals Marketing at (713) 494-5115, extension 3286.

Computerworld

Yes! I am interested in the new Model 765/763 terminals with bubble memory.
☐ Please have your representative call me.
☐ Please send me more information.

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COMPANY ______
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M/S 784, Houston, Texas 77001 4-8-CW

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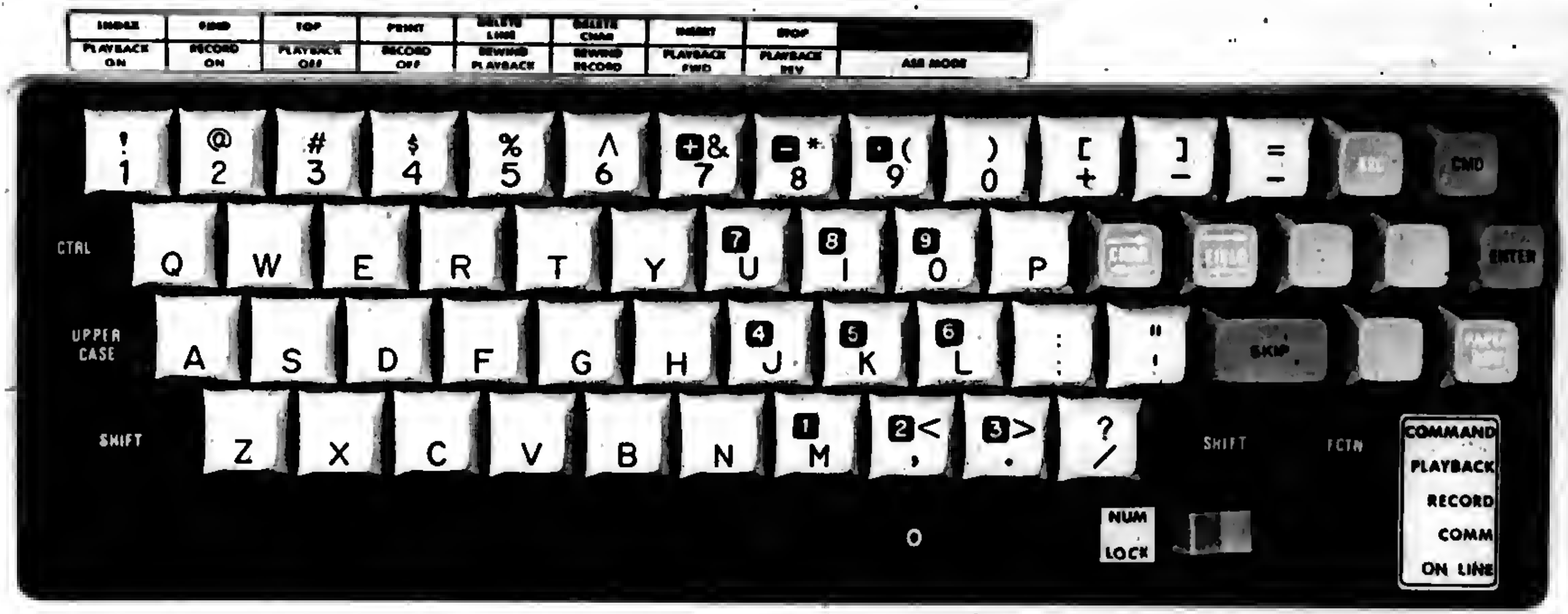
Powerful editing functions...and easy to use.



Index. *Allows the user to locate a line of text for editing by specifying a relative line number.*

Find. *Allows the user to locate a line of text for editing by specifying up to 15 ASCII characters.*

Print. *Allows the user to initiate and terminate printing of text.*

Insert. *Allows the user to insert additional characters into the text being edited.*

Delete Character. *Deletes characters where desired.*

Delete Line. *Allows the user to delete multiple lines of text where desired.*

Stop. *Allows the user to terminate editing mode.*

Top. *Allows the user to set record reference to beginning of file.*

Bubble Memory...New Technology for Mass Storage
Contained in a small module, bubble memory is an electronic chip that stores digital information by changing the magnetic polarity of tiny areas in the chip called bubbles. The tiny bubbles are actually cylindrical magnetic islands polarized in a direction opposite from that of a film in which the bubbles function. The memory has no moving parts, and because it works magnetically, it retains information even when the power is turned off, a quality particularly important for portable equipment.

Bubble memory has advantages over electro-mechanical mass memory devices such as paper tape, cassettes or floppy discs. This new technology offers solid state reliability, higher access speeds, smaller size, and less weight and power consumption.

The 765 terminal can access any indexed record in memory in less than 15 milliseconds, compared to a search time from several seconds to several minutes for a cassette system. If the data location in the 765 memory is not known (not indexed), the character string search speed is 1000 characters per second, about four times the speed of a cassette search. Compared to a floppy disc, the bubble memory indexed record access time is more than ten times faster, but total data transfer rates are lower.

Also available in Model 763 Memory Terminal.
The 763 terminal, a stationary version of the 765, is available for applications requiring non-volatile memory and text-editing capabilities. The 763 is equipped with TTY or EIA interfaces for external communications. At under 16 pounds, the 763 is a compact unit appropriate for use in any fixed location.

At $2695† — quantity one price — the 763 terminal is another price performance leader from TI.

TI's Model 763 Terminal

Nationwide Sales and Service
Wherever the Models 763 and 765 Memory Terminals are used, the Texas Instruments nationwide network of factory-trained sales and service personnel is available for support. Sales and service offices are located throughout the United States as well as Canada and major countries overseas.

†U.S. Domestic Price.

TEXAS INSTRUMENTS
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Welcome to Our New World

With this issue, *Computerworld* is starting a new section: Microcomputing.

This weekly feature will cover the latest developments in micro products and software as well as application stories on how hobbyists and others are using the new devices.

Although primarily aimed at the recreational computing market, the section will also cover some business uses of the new devices — particularly where businesses are using off-the-shelf, kit-type computers.

The advent of the microprocessor is changing the face of the computer community, broadening it and making computer power accessible to more people than ever before.

This is happening in two ways: First, microprocessors are being incorporated into more and more products offered to large computer users. These developments will continue to be covered in the other sections of *Computerworld*.

But along with that revolution there is another: Micros are increasingly being used by people in their homes, for enjoyment, not necessarily for business.

The developments in the field are coming fast and furious — yesterday's price breakthrough is old hat today. Hobbyists need up-to-date information on all the latest products, both in the hardware and the software areas.

That's what Microcomputing is all about.

As a weekly news publication, *Computerworld* can provide the timely information needed in such a fast-changing area — new micro hardware and software will be covered here first, just as new products in the other areas of the computer world are covered first.

But along with the latest product information, Microcomputing will also cover applications of the new devices, both for personal and business use.

And that's where you come in. *Computerworld* is interested in reader experiences with microcomputers — either innovative uses or just better ways to program and use some of the standby applications.

So if you're using micros to educate your children — or if they're using them to educate you; if you're using them to program your thermostat, balance your checkbook or just play Star Trek, let us know.

We're interested in all user experiences.

Not for Indexing Recipes

Personal Computers Seen Luxury Only

By Ann Dooley

CW Staff

CAMBRIDGE, Mass. — Although some people are predicting personal computers will sweep the country, "the personal computer market is not the dawn of the computational era," according to William Grinker, executive vice-president of American Used Computer Corp.

Speaking before a group of MIT alumni here recently, Grinker contended personal computers "will never be a mass market success, but more of a luxury item."

Homeowners won't be using them for indexing recipes or other household chores; it's the professionals who will use them in their work, he said.

Grinker emphasized that personal computers are different from the game-playing hobby computers on the market. The hobby market is 10 times larger than the personal computing market, he said.

But cospeaker A.F. (Sonny) Monosson, president of American Used, disagreed, saying that "everyone will have [a personal computer] in their house whether they use it or not."

Monosson noted there is no one definition of a personal computer. In trying to find out what one is, Monosson told the audience, he had asked various people — and no two answers were the same.

The only answer is that whatever computer a person uses is his personal computer, he said.

Most people over age 25 haven't gotten in on the personal computer craze anyhow, he said. They have their favorite standbyes which they use no matter what, he explained.

The personal computing craze began two years ago in California and the cult swept the East, Grinker said. A year ago, American Used opened The Computer Warehouse Store in Boston on a limited basis and has had to keep it open for longer and longer hours to meet the demand, he said.

The personal computing market transacted $1.2 billion dollars in business last year, Grinker stated. Although it might not be able to sustain such a pace, it has expanded rapidly, he said.

No one is sure where any growth will lead, he added. A Southern California Computer Society study found 85% of personal computer use is work-related, he pointed out.

The community from which the personal computer user is drawn consists of 1.5 million people, of which not more than 10% will be permanent users, he estimated. Most will dabble in it for a while, probably swept into the market from the "Christmas hype" that will be occuring this fall, he predicted.

User Profile

Personal computer users will usually be professionals in the computer field, according to Grinker. It is estimated that 400,000 DP professionals, mostly software-oriented types, help make up the market, he said.

Programmers want to own their own computer because they have no control over the computer at work: they can do whatever they want with their personal computer, Grinker said.

The second group of personal computer users is made up of students. It is estimated that as many as 500,000 high school students and college students will be users, Grinker said.

"The most intense hobbyists are not in college, but in high school," he added. "They're really frightening."

The third group in the personal computing market is the experimenters, according to Grinker. Numbering nearly 300,000, they are the ones who become involved on an intellectual level, he said.

And the fourth group includes about 300,000 ham operators, Grinker said.

Personal computer use won't be completely work-related, Grinker acknowledged. The computer could be programmed for several unusual applications, such as a cocktail party model to calculate how expensive the party would be depending on the kind an amount of liquor served.

Another application could include programming the computer to handle and expense account, entering the known expenses and having the computer fill in the rest.

Nothing has really changed in the hardware and software relationship in the last 20 years, Grinker continued. Computers are smaller, cheaper and faster, but they are still incomplete without the software to finish them off, he said.

Zilog Takes Modular Approach, Announces Family of Boards

CUPERTINO, Calif. — Zilog, Inc., has introduced a family of microcomputer boards to offer users a modular approach for building computing and processing systems.

Zilog's MCB series was designed around the firm's Z80 microprocessor unit (MPU) circuit and a single-chip NMOS silicon gate device with a clock rate of 2.5 MHz. Its 158-instruction set includes all of the 8080A and 8085 instructions, a spokesman claimed.

Each of the present boards is bus-compatible and directly interfaces with all other boards in the series, he noted.

Leading off the series is the Z80-MCB microcomputer board. Designed to operate as a single-board computer, it has self-contained memory plus serial and parallel I/O ports.

The Z80-MCB has a capacity of 4K bytes of dynamic random-access memory (RAM) as well as up to 4K bytes of programmable read-only memory (Prom), erasable Prom (Eprom) or masked read-only memory (ROM).

The Z80-MCB, which costs $495, can be expanded to include more I/O and memory by adding other boards in the series. A strapping option allows users to put 16K by 1-bit dynamic RAMs in place of the 4K by 1-bit RAMs, the spokesman said.

The Z80-MDC memory/disk controller board provides users with 12K bytes of dynamic RAM and a floppy disk controller capable of handling up to eight floppy disk drives.

The Z80-MDC has a strapping option for setting start addresses of each 4K-byte page. Sixteen-bit cyclic redundancy checking is also featured, according to the spokesman. The board sells for $795.

16K Bytes of RAM

The Z80-RMB memory board has 16K bytes of RAM and up to eight ROM or Prom chips per board. The strapping option allows memory to reside in any segment of the 64K address space. It costs $750.

Also in the family is the Z80-PMB Prom memory board, providing up to 32K bytes of ROM, Prom or Eprom. Jumper options allow each 16K bytes of memory to reside in any segment of the 64K address space.

The board costs $395, excluding the cost of the Prom chips.

Zilog is located at 10460 Bubb Road, Cupertino, Calif. 95014.

Motorola Puts 8-Bit System Into Kit Form

TEMPE, Ariz. — Motorola Semiconductor Products, Inc. has introduced an 8-bit microcomputer system in kit form.

The Educator II contains an NMOS 8-bit M6800 microprocessor unit (MPU), peripheral interface adapter (PIA), 128 by 8-bit static random-access memory (RAM), two TTL 512 by 4-bit read-only memories (ROM) and a TTL clock circuit.

An executive program residing in the ROMs contains routines for examining and modifying memory locations and MPU registers, servicing interrupts, transferring programs to and from cassette tapes, searching tapes for specific programs and testing the finished kit, according to a spokesman.

The executive uses 14 bytes of RAM for a scratchpad; the remaining 114 bytes are available for user programs.

An optional 128 by 8-bit RAM can be added for larger user programs, the spokesman said, noting the kit contains all necessary parts, with the exception of a power supply, to bring the system "up and running."

Aluminum Case

Educator II is housed in an aluminum case. Front-panel toggle switches and LEDs are used to enter and display machine code.

Edge connectors on the printed circuit board provide an interface to the PIA and the address, data and control buses for system expansion.

Accessories planned for the Educator II include a video display kit, module card rack and power supply, memory modules and applications programs on cassettes, the spokesman said.

Educator II retails for $169.95. Additional 128 by 8-bit RAM costs $19.04 and a power supply kit is priced at $29.95 from the firm at 705 W. 22nd St., Tempe, Ariz. 85282.

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For Southwest 6800

Dual Minifloppy Debuts

SAN ANTONIO, Texas — A dual minifloppy kit designed for its 6800 computer system has been introduced by Southwest Technical Products Corp.

The MF-68 minifloppy disk system includes all of the hardware and software needed to provide a complete dual-disk operating system, according to a spokesman. The system can be expanded to its four-drive limit with an MF-6X expansion kit.

The software provided with the MF-68 includes both disk Basic and a floppy disk operating system. The operating system commands for disk operation include CREATE, SAVE, RUN, LOAD, PURGE, PACK, CATALOGUE, RENAME, INITIALIZE and PATCH.

The MF-68 is offered in kit form only. It includes controller, chassis, cover, power supply, interconnecting cables, assembly instructions, two assembled Shugart minifloppy drives and a diskette with the operating system and disk basic.

The MF-6X expansion kit includes power supply, chassis, cover and two assembled minifloppy drives.

Prices of $995 for the MF-68 and $850 for the MF-6X include prepaid postage. Southwest is at 219 W. Rhapsody, San Antonio, Texas 78216.

Cramer Kit Bows

NEWTON, Mass. — Cramer Electronics, Inc. has introduced a single-chip 16-bit microcomputer kit that sells for less than $600. The kit includes a hardware multiply and divide capability, according to a spokesman.

The Texas Instruments 9900 Cramerkit features 16 1K by 1-bit static random-access memory chips, two 1K by 8-bit erasable programmable read-only memory (Eprom) chips, 128 bits of I/O and an on-board Eprom programmer.

The only two hardware items not included in the package, according to the spokesman, are the power supply and the panel board, which can be purchased separately if needed.

The kit sells for $595 from Cramer Electronics at 85 Wells Ave., Newton, Mass. 02159.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Study Eyes Firmware Changes

Price/Performance Shift Seen Continuing

By Molly Upton
CW Staff

MENLO PARK, Calif. — Price/performance values of large IBM and plug-compatible mainframes will continue to shift throughout the rest of the 1970s, according to a report from Input, Inc., a research firm here.

The resultant values for users and changes in margins and products for manufacturers will have a variety of ramifications, according to Input's predictions.

IBM is likely to introduce more processors of the 3033 ilk, including those that can be tightly coupled; it will also continue to shift functions among hardware, firmware and software, which will make continued compatibility with IBM functions difficult for firms such as Amdahl Corp., Input stated.

"As a long-term strategy, Amdahl must at some time deviate from total compatibility with IBM. The economic impossibility of constantly reacting to all the hardware/-firmware/software tactical announcements from IBM in the large systems arena makes this strategy mandatory," the report contended.

Mass storage systems and communications processors appear to be the most promising areas for Amdahl to expand its product line prior to 1980, Input suggested, adding Fujitsu has product offerings here that would fulfill Amdahl's needs and also allow Fujitsu to achieve market goals in the U.S.

Future Offerings

Input projected IBM will introduce a 3031 and 3032 as well as a 3033 TC1 and 3033 TC2, which are tightly coupled alternatives of the 3033. Compared with the price/-performance of the 370/158-3, using its old price, these machines will offer price/-performance ratios of 2.7, 4.5, 6.5 and 7 respectively, Input said.

Amdahl needs a clear price/performance advantage over comparable IBM systems, Input said. The research firm suggested Amdahl could react to the coming 3032 announcement by adjusting the price of its 470V/6-II to that of the V/5 and lowering the V/5 price to about $2 million.

"This would result in a more reasonable price spread for the 470 line and establish clear price/performance advantages over the IBM line," the report indicated.

Amdahl has yet to respond adequately to the 370 Extended Facility, Input said, but observed "any deviation from compatibility will result in an adverse customer reaction out of all proportion to its true significance."

Along with the increased price/performance ratios of new IBM machines will come a drop in the residual value of current IBM processors, Input noted.

Input forecast the residual values of the 370/158 and 168 will stabilize in the 30% to 35% range near the end of 1978 and drop again early in 1980 because of a new processor family announcement by IBM.

By 1981, the 168's residual value will be about 10% of its 1976 value.

Itel Challenge

The most important challenge confronting Itel Corp. will be the "effective management of its inventory of IBM equipment," the report said. "This single issue will have the greatest impact on Itel's profitability — even more than any of its own products.

"Plug-compatible mainframe makers, like their peripheral supplier counterparts, are going to find out just how expensive it is to keep up with IBM," Input added.

As their profit margins become squeezed, they "must be able to retain IBM compatibility until they achieve a significant user base. This means they must be able to respond to the hardware/firmware/software announcements of IBM, particularly announcements such as the Extended Facility," the report continued.

Others Affected

But plug-compatible manufacturers are not the only ones affected. Although users of the other mainframers indicated they are content, "the price/performance pressure" exerted by the large systems at the top and by minis at the bottom "results in an unsatisfactory competitive situation for medium- and small-scale stand-alone systems," according to Input.

And minicomputer and terminal makers will have their problems maintaining compatibility as IBM moves to its System Network Architecture.

"All mainframe manufacturers will be affected by IBM's emerging hardware/-firmware/software strategy."

IBM Barriers Active and Passive, Economist Tells Antitrust Trial

By Catherine Arnst
CW Staff

NEW YORK — IBM has erected both active and passive entry barriers to prevent competition in the general-purpose and plug-compatible computer markets, according to Dr. Alan K. McAdams, the government's chief economic witness in the U.S. vs. IBM antitrust trial.

Passive barriers are those which already exist in a market when a competitor tries to enter it and are not directed at any one firm. Active barriers are those which "go beyond what is normally expected" by competitors and are directed specifically against a particular firm or market segment, McAdams explained at the trial recently.

Creating a leasing environment in the computer industry and bundling systems and services together are two types of passive barriers IBM has erected, the Cornell University economics professor testified.

The leasing environment provided IBM with the advantage of strict account control and the stability of recurring revenues, he said. However, it requires a new entrant to have large amounts of capital to compete effectively because profitability is deferred for years; this makes it difficult to attract investors, McAdams said.

This has never been a problem for IBM, whch generally has a large cash hoard and is considered an attractive investment by the financial community, he told the court.

By bundling the price of software, maintenance and support with the price of a computer system, IBM was also able to contain competition passively, McAdams said. This method also required new entrants to the market to have large amounts of capital, he added.

The requirement for plug compatibility offered a passive barrier to entry into the peripherals market, but numerous firms managed to enter in spite of that obstacle, McAdams testified. As a result, IBM adopted business strategies that created "very substantial active barriers," he said.

In 1970, when plug-compatible manufac-

(Continued on Page 40)

CI Notes

CSC Wins Dismissals In Separate Lawsuits

Federal district courts in California and New York have rendered judgments in favor of Computer Sciences Corp. (CSC) in two unrelated law suits. The law suits concerned a stockholders' class action and a charge of patent infringement.

In Los Angeles, the Federal District Court ruled CSC did not violate securities laws in connection with a 1970 earnings projection. A CSC stockholder had claimed the company issued a misleading earnings projection because of the subsequent discontinuance and write-down of its Computicket operations.

The suit, filed in 1970, sought damages of an unspecified amount on behalf of persons who had purchased CSC stock between Jan. 20 and April 3, 1970 and who held the stock beyond the April 3 date.

In the second case, the Federal Court for the Southern District of New York, in dismissing the complaint, ruled CSC's computer-based system for off-track betting in New York City did not infringe on a patent held by Electronic Assistance Corp.

This 1971 suit also sought damages of an unspecified amount. CSC ceased to operate its off-tracking betting system for the city in 1973.

Judge Nixes Univac Award

PHOENIX — A judge here has issued a permanent injunction barring the State of Arizona from awarding a state computer contract to Univac.

The suit arose after Honeywell Information Systems, Inc. contested the award on the basis that its response to the state's request for proposals (RFP) for a system was priced lower [CW, July 25].

HIS 66/85 Deliveries Snagged

MINNEAPOLIS — Honeywell Information Systems, Inc. has announced a delay in initial deliveries of its Model 66/85 large-scale computer because of technical production problems.

The problem is in the new packaging technology of integrated circuits which HIS is planning to use in the system. No details were available.

No new delivery date has been set. HIS does not want to commit itself to a date because it wants to test the entire system again after the packaging problem is solved.

Decision Data Readying Moves With System 4

By Esther Surden
CW Staff

HORSHAM, Pa. — Univac's BC-7 system originated in the back room of a small company here, according to Louis H. Benzing, president of Decision Data Computer Corp.

As Benzing tells it, Univac contacted Decision Data in 1974 about developing a small business system. The firms started a joint venture in which a lot of Decision Data's people joined a special program dubbed Project Acorn.

The project continued until last summer, Benzing said, when Decision Data had some financial difficulties. Under an agreement reached with Univac, the Decision Data people from the project were transferred to the Univac payroll.

But Decision Data retains rights to the device which eventually became the BC-7 and can market it in any way it sees fit.

"We will probably take the product (called System 4) off into a different direction," Benzing noted. "Decision Data is moving very cautiously in this market."

At last count there were 90 companies offering a small business system; and it's obvious that given the choice between Decision Data, a small firm, and Univac, a large company, the user will choose Univac unless Decision Data can offer something that Univac can not, Benzing said.

"We are going to seek out a niche in the market that the big boys are not addressing," he stated.

The firm isn't putting all of its eggs in the small systems basket, however. Its primary business is in the IBM "aftermarket" — that is, the firm provides cheaper or better products than IBM to IBM customers, he claimed.

The company started out in 1969 to provide enhanced card punches and reader equipment for the IBM System 3. Several years later, it became obvious that the same product could be applied to 80-column cards.

The 96-column card readers and punches led to several OEM contracts, including a large one from Burroughs. When IBM decided not to pursue the 96-column card, however, the rest of the industry followed suit, leading to Decision Data's financial problems, he said.

"IBM seldom does anything by mistake," marketing manager Richard L. Schwab added.

In 1975, Decision Data introduced a line of System 3 printers and Mosfet memory and in 1976 followed with 360/370 printers. The company plans to build on its own user base when it begins to market its mini system.

"Key-to-disk is one possibility" in which the firm could sell either directly to its own end users or to OEMs who could add value, Schwab said.

Another option the firm may take with the System 4 is to keep it both batch and interactive because there is a "tremendous installed base that still wants to use cards," he said. With about 6,000 customers, "we are also one of the few companies that is out there in that user base already."

The market the firm serves is very price/performance-oriented, Schwab added. "The users will get interested if you can save them a few dollars; most will be interested if you can prove they won't have a problem with the product; and all are really looking at the performance, the product must increase the total throughput of the system," he said.

Witness Details Market Barriers

(Continued from Page 39)

turers (PCM) were considered viable competitors, IBM established the Cooley task force, which recommended that IBM explore ways of interlocking IBM peripherals to IBM systems through software and system architecture. It also suggested IBM develop peripheral rental and purchase pricing plans that would be competitive and consistent with IBM's product strategy of technical escalation, according to the government's pretrial brief.

Thus, the Cooley task force designed many of the active barriers IBM instituted in this market, McAdams said.

Changing the interface design was one of the active barriers often employed by IBM in the disk and tape drive markets, McAdams said. By changing the interface, IBM forced a competitor to redesign its entire product to ensure it would successfully plug into an IBM CPU.

In the disk drive market, IBM introduced the 2319A disk drive for attachment to the 370/145 to stop further encroachment on its 2314 disk drive base, McAdams said.

IBM's Fixed-Term Plan (FTP) is yet another example of an active barrier to entry, McAdams said. The FTP, instituted in May 1971, offered low rental prices to users who signed long-term leases but it penalized those who canceled before the lease termination date with large termination charges.

The FTP was only available to users for tape drives, disk drives and printers — all products on which IBM met competition. It locked users into IBM products for the length of the lease, effectively protecting those markets from competitive encroachment, he said.

Also, at the end of the two-year plan, most users exercised the purchase option available, he added.

When less computer equals more performance, small really is beautiful.

A special report on *Minicomputers and Small Systems* in the August 29th *Computerworld.*

Minis are now functioning at every level of business and industry, and *Computerworld's* August 29th special report, edited by Esther Surden, will focus on several issues that are currently the subject of widespread discussion and debate in the minicomputer field.
We'll also cover minicomputer hardware in depth — including microcomputers being used in data processing systems. In all, you'll see a variety of applications stories and tutorials on topics like these:

- Programming languages for small business systems — commentary on languages that have the same name but because of the "improvements" added by competing vendors, may have wide variances in operating efficiency.
- How to evaluate technical evaluations — a look at what benchmark tests and product specifications mean.
- The evaluation and selection process — a case study.
- Minicomputer maintenance — analysis of possible methods (vendor maintenance, independent service organizations, and end user self-support) with an eye to cost savings.
- Minicomputers in distributed processing — stand alone and communicating.
- Using minicomputer equipment — including general purpose minis, small business systems, turnkey systems, miniperipherals and microcomputers.

If you're interested in finding new ways to make data processing more useful and cost effective throughout your organization, you should read our special report in our August 29th issue And if you're a mini manufacturer, OEM or systems house who's interested in telling potential customers how your equipment can help them in their jobs — advertise here. Your *Computerworld* salesman can give you complete details. But don't miss the August 12th ad closing date. Call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Time Needed to Build Supply

Delay on DAA Registration Seen Fortunate

By John P. Hebert
CW Staff

NEWTON, Mass. — Telecommunications users connecting equipment to the public telephone network would have had a long wait for Data Access Arrangements (DAA) if manufacturers of the devices hadn't won a delay from the Federal Communications Commission (FCC) in late May, according to officials from Elgin Electronics, Inc. of Waterford, Pa.

The FCC's mandatory registration ruling otherwise would have gone into effect on June 1 as scheduled, E. Joseph Seppala, Elgin's marketing manager of telecommunications products, said at a recent press conference here.

The resulting demand for FCC-certified DAAs would have outpaced their supply, Seppala said.

The DAA, or data coupler, interface provides the means of connecting customer-provided equipment with switched telecommunications networks without electrical harm, Seppala explained.

Even though farsighted individuals could have — after the Carterfone Decision in 1968 — predicted registered DAAs would someday become a reality, neither users nor independent DAA manufacturers were prepared for the FCC's mandatory registration process, Seppala indicated.

Fortunately for users and vendors alike, the FCC extended its ruling's full implementation until Jan. 1, 1978.

Not Prepared

The independent manufacturers of DAAs — and users — didn't take the FCC's registration program seriously even by the fall of 1976, although the commission originally intended to implement the registration program the previous spring, Seppala said.

AT&T obtained a court stay delaying the program from the originally scheduled implementation date of April 1, 1976 until January of this year, when it again asked the courts to delay the program until June 1.

But before that implementation target date, DAA manufacturers realized they were unable to fill all of the orders for the protective devices. The vendors asked the FCC to extend the registration date until Jan. 1, 1978, Seppala explained.

When that date finally arrives, barring additional unforeseen delays, AT&T's Western Electric manufacturing subsidiary will probably stop making DAAs because it said it will not be financially practical to register and supply tariffed devices to users, Jack Van Arsdell, vice-president of marketing at Elgin, said.

Even now, users are telling the telephone company to take their DAAs out and telling independent vendors to install their registered units, Seppala said, adding Western Electric's warehouse is becoming overstocked with unregistered data couplers.

But the independent vendors can't keep up with user demand, according to Seppala. "In September or October, manufacturers will be in a better position to supply the equipment," he said.

The reason for this delay, according to Harry A. Montgomery, Elgin vice-president of engineering, is the many steps associated with the FCC registration procedure.

First, a vendor's design engineers must be familiar with Part 68 of the FCC rules. If they aren't, Montgomery said, the company will have trouble registering the equipment.

Secondly, many test steps are required to ensure the unit's protective function. A company can easily spend 80 hours testing each class of unit, which adds up to a substantial investment, Montgomery said.

Once the factory has performed the tests, the test data must be put on paper — the equivalent of another 40 hours, he said.

Then, when the forms are submitted to the FCC with product photos and wiring schematics, they go to the bottom of the pile. Once reviewed, the documentation must be placed in the *Federal Register* to allow for public comments.

A DAA manufacturer must reply to each comment and to each reply. "Then the FCC is satisfied," Montgomery said.

What is the time for that registration procedure? Elgin, for example, applied for the FCC stamp of approval last November and early this month the product was still not registered.

But the result of these involved procedures will benefit users, who should see a drop in today's price of between $100 and $150 to a figure well under $100 in the near future, Seppala added.

In the future, modem manufacturers may follow the example of Vadic Corp., which brought out the first FCC-registered modem [CW, April 4], according to Seppala.

Other manufacturers will probably register modems with discrete, integrated DAAs to offer users a device compatible with the switched network and prevent other vendors from inspecting the circuitry, he said.

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Israeli Bank Going IBM

By **Aaron Sittner**
Special to CW

JERUSALEM — The Bank of Israel plans to acquire its own IBM 370/158 system and discontinue subscribing to the services of the "Office Mechanization Center," the Israeli government's central DP unit.

The central bank's director of data operations, Joseph Sarig, said the IBM installation with ancillary equipment would be leased for $1.26 million per year.

The decision to lease the 370/158 followed a recommendation by a three-man committee of bank executives, but without issuance of a public tender, as is customary for acquisition of costly apparatus.

Trade circles report that Burroughs, NCR and Control Data Corp. agents in Israel will protest the skipping of an open tender by the Bank of Israel. They say the decision was "arbitrary and will only reinforce IBM's monopoly on DP operations in Israel."

Want Unbundled Software

Japanese Ready Processor Entries

By **Molly Upton**
CW Staff

TOKYO — Although Fujitsu and other Japanese mainframe makers are expected to react to IBM's pricing and product announcements with new products, they welcome IBM's practice of unbundling software and would like to imitate it, according to *EDP Japan Report* (EDP/JR), a newsletter from International Data Corp.

Fujitsu is expected to announce soon an enhanced version of its M-190. It is reportedly a multiprocessor with four CPUs having a price/-performance 40% greater than that of the IBM 3033, EDP/JR reported.

International News

And Hitachi is reportedly preparing a competitor to the 3033 and Fujitsu's proposed M-190H for introduction this fall.

Smaller Systems

In the smaller systems arena, Fujitsu has used 16K RAMs in main memory of its M-130 and M-140 systems, which it said offer better price/-performance than the 370/-115-2 and 125-2.

Memory cost is about 20% to 30% less than with 4K chips, the firm told EDP/JR. Access time of the new chip is from 200 nsec to 300 nsec, according to the newsletter. First deliveries will be in March.

In addition, Fujitsu may also enhance its M180II and M-160 processors, with price adjustments along the lines of those in the 370 series, according to the newsletter.

Nippon Electric Co. (NEC) and Toshiba will probably also effect price and/or product changes in their lines.

But the financial pressure is already being felt by the domestic makers all of whom provide extensive software services without charge.

"It will simply be impossible for us to announce new hardware systems with price/-performance comparable to IBM's unless we completely unbundle software and hardware prices," one industry executive told EDP/JR.

Japanese users are reluctant to use packages without extensive tailoring by the systems vendor, according to the report.

One Nippon Univac executive explained: "... The average customers in Japan never accept our standard products as they are; we have to make all the necessary modifications so they can use our program products in their own business environment without making any changes whatsoever."

A survey indicated more than 70% of the applications software used in Japan was developed by hardware manufacturers, compared with less than 20% in the U.S.

Fujitsu incurs a loss on its software service, EDP/JR indicated, principally because of its practice of providing all systems software and most applications software without charge.

The firm spends about 10% of its annual computer business sales on software development, but its income from software services is less than half of the expenditures, EDP/JR said.

The newsletter observed "... Some domestic mainframers are welcoming IBM's policy of charging for certain advanced software systems, because they feel it may get Japanese users accustomed to paying for software products, and thus brighten the profit picture for them."

Severe Competition

There is already severe price competition in the Japanese computer market and the rental policy of the Japan Electronic Computer Co. (JECC) provides a further drain on company revenues, the report said.

The JECC, which is the only major computer rental outlet in Japan, was established by the government in order to eliminate the costs incurred by manufacturers in setting up their own rental bases.

However, JECC requires that a manufacturer buy back the machine from JECC at the depreciated value when returned by the user.

The average Japanese computer user upgrades every three years, so a system with a sales value of $1 million, rented through JECC and returned after three years, will cost the manufacturer $460,000, EDP/JR observed.

Thus the cash squeeze is on, and "many domestic mainframers are experiencing great difficulty generating the funds necessary to operate a profitable computer business," the newsletter continued.

Hitachi and other computer firms are now trying to deal directly with their customers who want leases and JECC's profits have fallen 11% in fiscal 1976.

For its part, Hitachi has reduced dependence on JECC from 35% in fiscal 1970 to 5% in 1975, while its own rental business grew from 51% in 1970 to 55% in the first half of 1976, according to the report.

IBM's share of the Japanese market is only 30%, considerably smaller than elsewhere in the world.

The report lists several reasons for IBM's relatively small base, including: unrestricted price competition; users' affinity for free software and their dislike for standardized program products; and the increased facility with which users can switch from one maker's system to another's.

Small Systems Thrive in Canada

By **Bohdan O. Szuprowicz**
Special to CW

Ifip Congress 77 will be held in Toronto, Canada, from Aug. 8 to 12 and because it will attract computer industry notables, scientists and experts from all over the world, it is worthwhile to have some idea of what Canada's computer industry looks like.

According to a recent report of the Computer/Communications Secretariat of the Canadian Department of Communications in Ottawa, the total computer population in Canada at the end of 1976 was estimated at 14,355 systems. Another source, the Arthur D. Little research firm, estimated the value of all the installed computers in Canada at about $2.4 billion.

Most of the computing equipment in Canada, in fact an estimated 95% of total value, is imported from the U.S. By 1981, however, when the total installed equipment value may double, it is expected that a drop of about 3% in cumulative U.S. market share will occur.

Of all computers in Canada, about 8,500 or almost 60%, are very small with annual rental value below $12,000. Installations of such very small machines, many of which are in the intelligent-terminal category, are expected to grow at 26% until 1980 and average 12% through 1985.

IBM's Share

IBM, not surprisingly, enjoys the largest market share in Canada, estimated at about 30% of the total number of installations and probably closer to 60% of the total value of installed equipment. Honeywell, Univac, Control Data Corp., NCR and Burroughs are the major runners-up, although Digital Equipment Corp. traditionally enjoyed a large market share of minicomputer installations.

Among other minicomputer suppliers, Hewlett-Packard, Data General Corp., Interdata and Varian are the leaders, although Philips of the Netherlands and now Nixdorf of West Germany are making significant inroads.

In 1974, Canada imported $519.8 million worth of office equipment, computers and peripherals, but it also exported $286 million of the same products. With a large and rapidly growing domestic market, Canadian computer equipment and services suppliers want to develop as large a domestic computer industry as possible.

Immediate Future

For the immediate future, at stake are several billion dollars of DP expenditures by which the total market will grow between now and 1985.

While hardware business is dominated by U.S. manufacturers, in the DP services areas Canadian companies are well ahead.

There is also a lively stock market in the shares of Canadian computer service companies such as Computel Systems, Comtech Group, Dataline Systems, Multiple Access and Systems Dimensions.

The major concern of the Canadian computer industry is whether, as computer use grows, Canadian suppliers will grow with the market.

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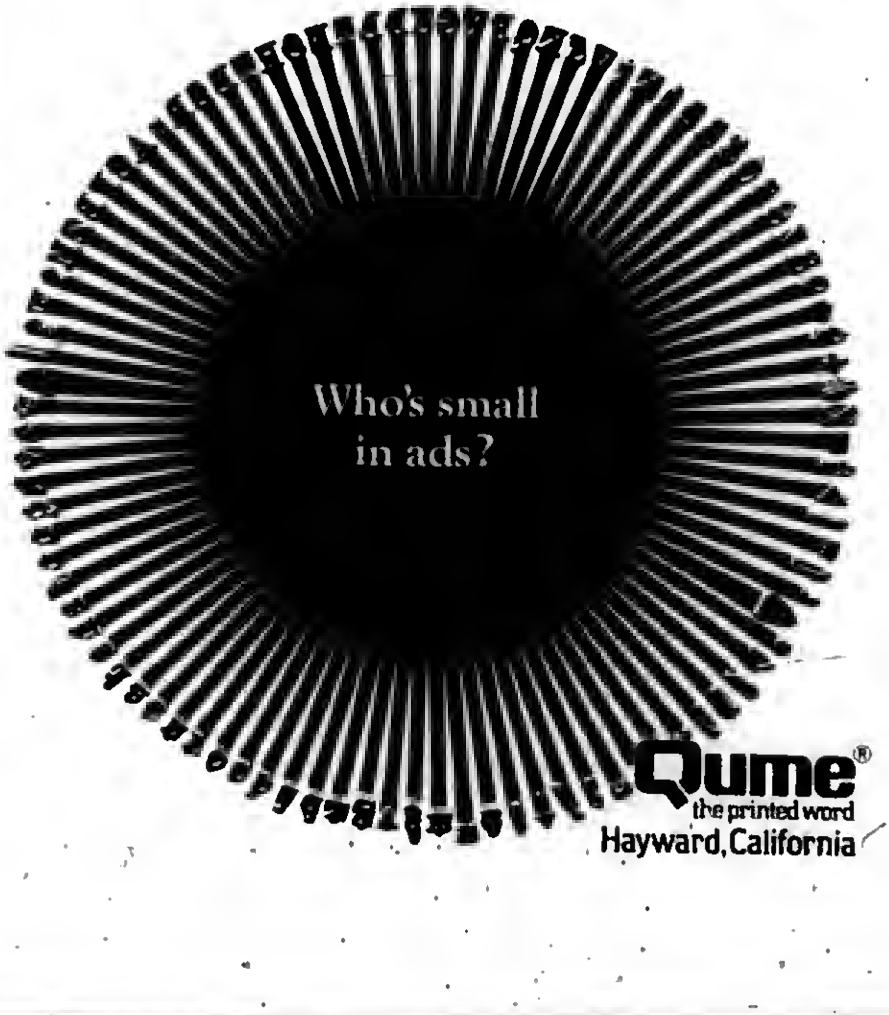

Financial News

Univac Share of Sperry Revenues Hits 45%, Record $1.47 Billion

By Toni Wiseman
CW Staff

BLUE BELL, Pa. — As the largest division of Sperry Rand Corp., Sperry Univac generated nearly 45% of the corporation's revenues and profits in 1976.

Revenues for Univac hit a record of $1.47 billion in 1976, the firm said.

Broken down, 58% of the revenues, or $865 million, was from U.S. business, 35% (including 7% from joint ventures), or $612 million, from international sales.

An examination of the commercial business mix shows 27% attributable to expansions, 30% to new customers (either first-time users or competitive replacement and 43% to replacements and new applications.

Total commercial computer revenues in U.S. markets during the year were $547 million; revenues from U.S. federal government commercial computer installations were $131 million, while business in the private sector, state and local governments generated $416 million, the report noted.

Univac revenues from the OEM/plug-compatible market (PCM) reached $74 million in 1976, an increase of 54% over the $48 million reported in 1975: OEM/PCM bookings rose to $66 million in 1976, a growth of 47% over the prior year.

Worldwide bookings were $1.2 billion in 1976, a 96% increase over the $632 million in bookings recorded in 1971, representing a compound growth rate of 15% for the five-year period, the report said.

At year end, Univac's installed base worldwide was valued at $7.8 billion, it added.

Commercial orders were up by 42% in the quarter over a strong fourth quarter last year and up 12% over a year ago. Computer demand in Europe picked up significantly in the fourth quarter after lagging earlier in the year, according to J. Paul Lyet, Sperry's chariman and chief executive officer.

Order gains for computer systems were spurred by increased worldwide demand and the introduction of several new products such as the large-scale Univac 1100/80 series and the BC/7 small business system, Lyet said. The phase-down of certain office equipment operations continued on schedule and the remaining operations are approaching a break-even position, he noted.

For fiscal 1977, the division expects to meet its objective of an increase of more than 10% in computer revenue and profits, despite the significant impact of an unfavorable foreign currency translation, according to a Univac progress report.

For the year, R&D spending for computers will total about $128 million, the report said, noting R&D spending has grown 120% during the past five fiscal years and totaled $470 million during that period. For the next five years, R&D expenditures are expected to reach nearly $900 million.

The report also noted that the worldwide installed base of Univac general-purpose commercial systems grew 55% from 1972 through 1975, compared to the industry growth of 43%.

DP's Profit Profile

NEW YORK — Corporate profit performance for computer firms during the first quarter of 1977 were up 12% over the year-ago period, slightly ahead of the all-industries average of 11%, but far below, for instance, real estate's 179%, railroads' 42% and tire and rubber's 39%, according to figures compiled by *Business Week* magazine.

The industry had total sales revenues of $9.3 billion, up 10% from a year ago. Earnings were $855.4 million.

Data General saw the greatest growth in revenue, 49%, followed closely by Digital Equipment Corp.'s 48%. While IBM had the largest sales total, $4 billion, its revenues were up only 7% over last year.

In terms of profits, however, Memorex, Honeywell and Nashua were the leaders in gains with 118%, 114% and 99% respectively.

Burroughs' revenues gained 9% and its earnings 17%, while Control Data's gains were 10% and 14% respectively.

HIS Has Strong Second Quarter

MINNEAPOLIS — Honeywell's rental and service revenues from its computer business were up 17.1% over the year-ago second quarter — this following a 14.3% gain in the first quarter.

Worldwide sales, rental and service revenues in the second quarter were $705.2 million compared with $600.6 million in the year-ago quarter.

Earnings rose to $29.6 million or $1.41 per share compared with $19.3 million or 95 cents a share a year ago.

For the first six months, total revenues were $1.4 billion compared with $1.1 billion a year ago. Six-month earnings were $60.5 million, or $2.88 a share, including a $6.4 million extraordinary credit. This compares with 1976 six-month figures of $32.9 million, or $1.63 a share, including a $3.2 credit.

Edson W. Spencer, president and chief executive officer, said all major segments of Honeywell's business contributed to the company's performance. Operating margins in the computer business showed substantial improvement over last year's second quarter.

Spencer said Honeywell's prospects for the remainder of 1977 continue to be excellent and as a result, additional investment strengthening long-term product development will be made.

However, he emphasized that the rate of increase the company achieved in the first two quarters of this year would not be maintained in the second half because the third and fourth quarters of 1977 would be compared with much stronger 1976 periods.

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Earnings Reports

AOAGE
Yesr Ended April 2

	1977	1976
Shr Ernd	$.7	$.79
Revenue	5,400,000	5,500,000
Earnings	589,900	709,000

ADVANCED COMPUTER TECHNIQUES
Year Endad March 31

	1977	1976
Shr Ernd	$.11	$.28
Revenue	11,884,885	8,351,718
Eernings	142,872	332,405

AMPEX
Year Ended April 39

	1877	1976
Shr Ernd	$1.31	$.74
Ravenue	287,429,000	257,835,000
Disc Op	.....	292,000
Tax Cred	5,435,000	a1,355,000
Earnings	14,224,000	8,032,000
3 Mo Shr	.54	.06
Revenue	78,239,900	67,443,000
Disc Op	.....	292,000
Tax Cred	2,597,000	b(1,381,000)
Earnings	5,853,000	844,000

a-Includes $1,125,900 charga from settlement of class action suits. b-Includas $1,125,000 charge from settlement of class action suits and a reversal of $236,000 tax credit.

ANALOGIC
Three Months Endad April 39

	1977	1876
Shr Ernd	$.53	$.29
Revenue	4,399,229	2,858,895
Earnings	321,437	189,912
9 Mo Shr	1.36	.53
Revanue	11,458,517	7,252,820
Earnings	818,988	311,348

APPLIED DEVICES
Three Months Ended April 39

	1977	1976
Shr Ernd	$.98	$.11
Revenue	6,412,000	5,062,000
Tax Cred	112,000	194,000
Earnings	337,000	425,000
6 Mo Shr	.16	.17
Revenue	11,392,000	9,645,000
Tax Cred	241,000	299,000
Earnings	667,000	641,000

DATA TERMINAL SYSTEMS
Three Months Ended April 39

	1877	1976
Shr Ernd	$.83	$.38
Revenue	8,068,229	4,162,171
Earnings	985,143	593,696

FABRI-TEK
Year Ended April 1

	1977	1978
Shr Ernd	$.06	.....
Revenue	27,661,000	$25,296,000
Disc Op Loss	896,000	425,000
Loss	469,000	1,542,000

Nickels & Dimes

Total Systems, Inc. has agreed to acquire the assets of Anderson, Clayton & Co.'s **mortgage banking services operations** for an amount not to exceed $250,000.

$ $ $

Computer Sciences agreed in principle to purchase 1.5 million shares of its stock from the Jones Foundaton. The firm also agreed to file a registration statement which will enable the foundation to sell an additional 1.5 million shares through a public offering. The foundation is the principal beneficiary under the will of the late Fletcher Jones, cofounder, chief executive and largest shareholder of Computer Sciences until his death in 1972.

$ $ $

Applied Digital Data plans to buy back some of its stock from time to time, a move resulting from a pause in the firm's search for a company to acquire.

$ $ $

Anacomp has declared a quarterly dividend of 5 cents a share payable Aug. 10 to holders of record July 27.

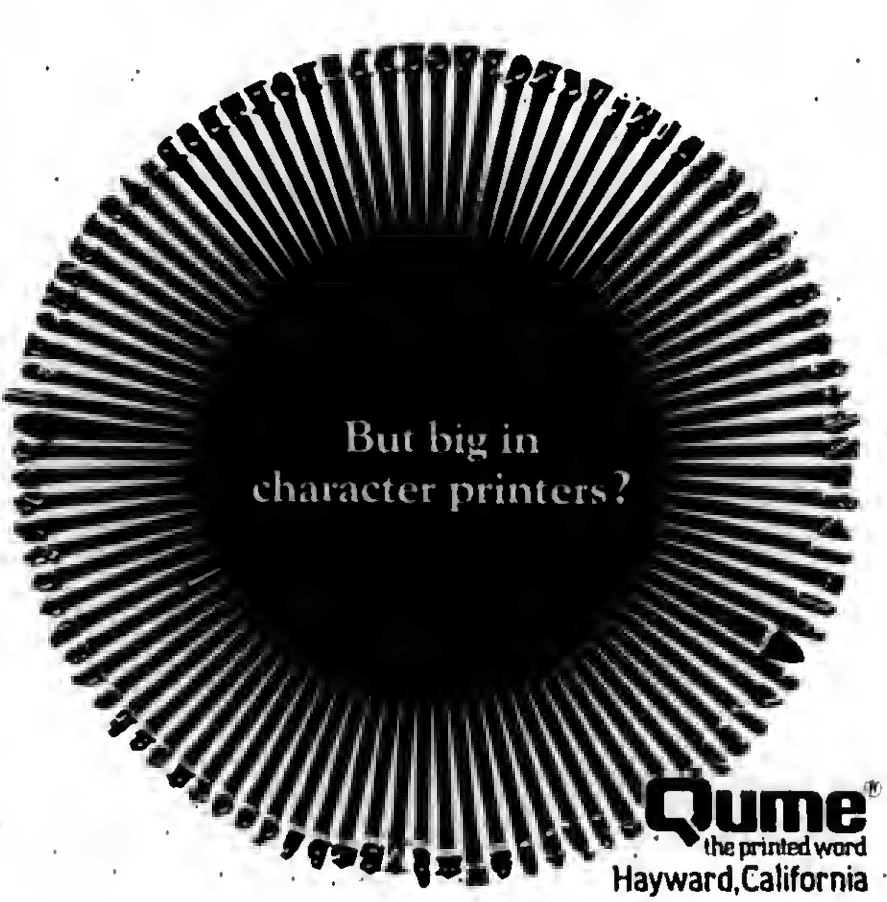
$ $ $

Lexidata has completed a private stock offering to raise additional capital.

$ $ $

National CSS has acquired substantially all of the 50,000 shares of its common stock which it announced its intention to acquire on Jan. 11, 1976.

Almost all of the shares which have been reaquired have been reissued upon exercise of nonqualified stock options or pursuant to the firm's qualified stock purchase plan for employees.



STC 'Super Disk' Sales Enjoy Rapid Growth

LOUISVILLE, Colo. — Two hundred fifty installations and still growing at an accelerating rate — that's the current picture of the installed base for the STC 8800 Super Disk, according to Systems Technology Corp. (STC).

STC, which had revenues of $122 million in 1976, began in 1969 with the production of plug-compatible magnetic tape drive products. Today, the company has more than 15,000 tape drive installations and, except for IBM, is the only manufacturer in the world producing drives with a recording density of 6,250 bit/in.

In 1972, STC conducted a study of storage requirement trends. This led to three basic conclusions:

- Disk devices would continue to increase in capacity.
- Increases in capacity would require performance enhancements.
- As capacity increased, the requirement for removability would decrease.

Heeding these conclusions, the company began development of the Super Disk, a storage device which provides 800M bytes of storage; operates with a four-arm rotary actuator to improve performance; and employs fixed rather than removable media for general use — a "first" for this type of product, according to STC.

Designed to operate with the IBM 360/50 and 65 and all 370 systems in high-volume and low- to medium-activity applications, the Super Disk provides performance that is equal to or better than that of IBM 3330 Model 1 and Model 11 disk subsystems at up to 50% less cost, according to Juan A. Rodriguez, STC vice-president of technology.

"The Super Disk offers 800M bytes of storage within 3330 disk architecture in comparison with 100M bytes for the Model 1 and 200M bytes for the Model 11," Rodriguez stated. "Therefore, the storage device can replace eight Model 1s or four Model 11s."

Five-Year Life

According to Rodriguez, the Super Disk was designed to provide maximum reliability and durability over a five-year, round-the-clock machine life. One of the most important factors behind this long life is the use of 3M Co. disks to prevent crashes caused by head/disk interfaces.

Featuring a coating which is used on all 3M disk products, the disks provide maximum surface coating uniformity and resistance to wear, enabling them to exceed Super Disk reliability and life requirements, Rodriguez said.

Furthermore, in production, STC goes beyond other disk manufacturers in terms of inspection and testing operations, according to W. Mike Deese, product engineering manager, disk products. Every disk, head and other component used in the Super Disk's data storage area is screened and inspected at the unit level before assembly.

Every spindle is screened by means of an acoustic signature analysis and all rotors are individually inspected for evidence of bearing damage, he said.

Following unit testing, Super Disk components are assembled and a burn-in test is run for 48 hours. During this test, a random-access program is run and checks are made for any failures of heat-sensitive parts.

Each Super Disk is then operated in a run-in test which continues for up to six weeks. During this test, designed to simulate an actual computer room environment, the storage device continuously runs a random-access program 24 hours a day, seven days a week.

A final system test includes various diagnostic analyses, after which each Super Disk is approved for shipment.

75 to 100 Users

According to Thomas D. Purtell, disk product manager, production volume deliveries of the STC 8800 Super Disk began in late 1975. Since then, 75 to 100 users have installed 250 Super Disks, and monthly shipments continue to grow.

User surveys indicate the Super Disk is being used for about 75% of data storage in a wide variety of different on-line, random-access applications involving large data bases and low to medium activity.

In remaining high-activity, random-access applications involving sort work, spooling files and basic operating system files, smaller capacity disk subsystems are used.

Product Plans

STC is now marketing an 8350 disk drive with two 317.5M-byte drives, which will be completely plug-compatible with the recently introduced IBM 3350 fixed-media disk drive. In addition, the company plans to introduce 8450 and 8850 Super Disks in the near future which will provide 635M bytes and 1,270M bytes respectively of storage capacity within 3350 disk architecture.

In contrast to the company's plug-to-plug compatible disk drives, STC Super Disks are customized to individual customer needs in terms of formatting data and developing inexpensive, effective backup systems, Purtell said.

Saves Money

"It's important to thoroughly understand the performance characteristics of the Super Disk because it is not simply a plug-in device," Rodriguez pointed out. "Used to its full potential, the unit does more than improve system performance; it saves a lot of money.

"In effect, the Super Disk can accomplish all of the functions of virtual disk storage with much higher performance characteristics and much smaller building blocks of storage capacity," the STC vice-president stated.

"Consequently, the Super Disk not only competes successfully with smaller capacity disk subsystems, but offers great advantages in comparison to a mass storage system, because it enables users to economically and efficiently increase their data base as required."

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Contracts

Westinghouse Electric Corp. has been awarded a $12 million contract by Pitney Bowes, Inc. to build a fully automated computer-managed warehouse.

Shugart Associates has received a $5.5 million OEM contract from Standard Electrica SA (Sesa) of Toledo, Spain, the Spanish subsidiary of International Telephone and Telegraph, for Model SA800 floppy disk drives.

Logicon, Inc. has received two contracts, a $4.5 million contract from the Boeing Wichita Co. for the development of a pilot production weapon system trainer for the U.S. Air Force B-52 and KC-135 aircraft, and a $1.1 million contract from the Space and Missile Systems Organization of the Air Force Systems Command.

Moore Systems, Inc. has received a contract in excess of $4 million from the Northeast Utilities Service Co.

Dataproducts Corp. has received a $4.2 million U.S. Navy contract for high-speed teleprinters.

Paradyne Corp. has been awarded a $2.5 million OEM contract from L.M. Ericsson of Sweden for medium- and high-speed modem cards.

Wangco, Inc. has received a $2 million OEM contract for peripheral products from Cobra S.A., Computadores e Sistemos Brasileiros.

Recognition Equipment, Inc.'s subsidiary Recognition Products, Inc. has received a $1.2 million contract from TRW, Inc. for its OCR wand readers.

Conrac Corp. has received a $1.4 million contract from the International Congress Center in West Berlin for display hardware, controllers and digital switching equipment.

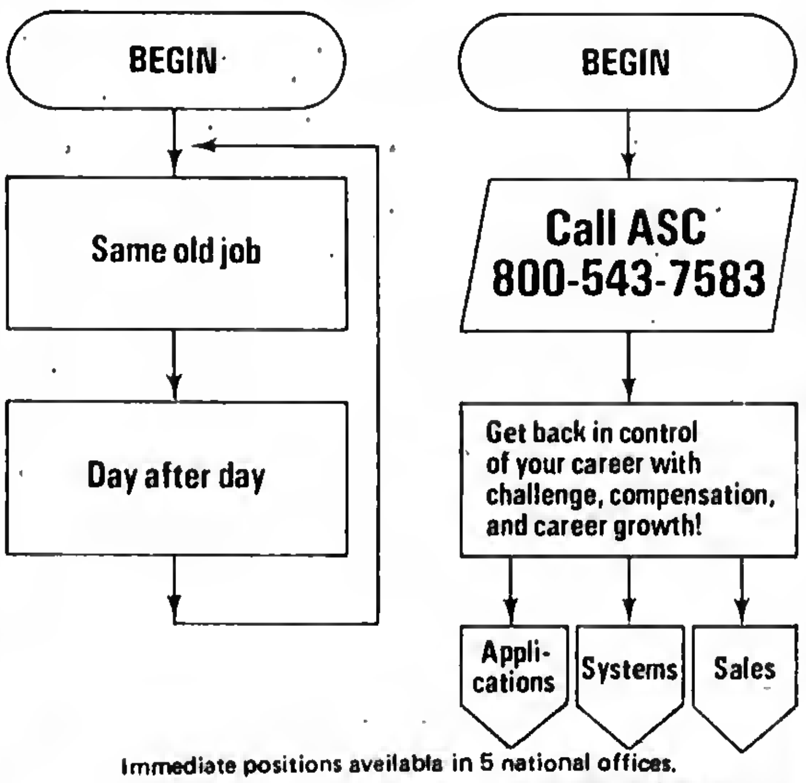
Honeywell Information Systems, Inc. has been awarded a contract from the American Society of Travel Agents to conduct a test of a computerized reservation system that will enable travel agents to access several airline reservation systems from a single display terminal.

National Data Corp. has received a contract to furnish its Deposit Reporting System to Bonanza, Burger Chef and Burger King.

Centronics Data Computer Corp. has received two contracts: a two-year contract from Raytheon Data Systems and a five-year contract from International Telephone and Telegraph for computer output printers.

POSITION ANNOUNCEMENTS

STUCK IN A LOOP?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SR. EDP AUDITORS

New Eng. openings for exp'd Indiv's in mfg and Ins. Industries. Acctg. bkgd is desired. Seleries from $16,000 to $27,000. Contact Slen Durbas for eddltional details.

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111 Pearl St.
Hartford, Conn. 06103
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PROJECT SUPPORT MANAGERS

Exceptional opportunity to interface with our clients and in-house enalysis/programmers. THhese positions require a strong anelytical beckground in IBM OS with manufacturing data bese experience helpful. THese openings are for our West Coast office with salaries to $30K. Our employees know of this ad. Send complete resume to:

CW Box 5119, 797 Washington St., Newton, Mass. 02160.

PROGRAMMER/ ANALYST

Progressive and growing subsidiary of a major NYSE corporation is seeking a highly qualified Oata Processing Professional to become responsible for systems development and implementation of integrated financial and manufacturing systems. This challenging position requires extensive exposure to senior levels of management and the ability to conceptuelize, design, develop and implement major data processing applications.

Qualified candidate should possess 3+ years of system design and programming with RPG II in an IBM System 3 environment. COBOL, Basic and/or line processing exposure as well as a college degree in engineering, business or computer science is desirable. Experience in hardware upgrade/conversion is a definite plus. We offer a very competitive salary and benefit structure with excellent advancement potential into Oata Processing Management.

Please submit resume including employers' names and salary history to:

Aviation Power Supply, Inc.
3111 Kenwood St.
Burbank, Calif. 91505
Attn: Personnel Manager
(213) 842-5207 ext. 260

DATA PROCESSING

Here's your opportunity to be instrumantal in the davalopment of new systems to support larga scale FINANCIAL, OPERATIONAL, ENGINEERING and RESERVATION functions of a nationwide corporation. Openings for senior and mid-level personnel are now availeble. Join us and grow.

REAL TIME COMMUNICATIONS PROGRAMMERS

Requires on-line experience for systems development in Assembler Languaga, maintenance, program testing and the installation of COC and PDP equipment.

PROGRAMMERS & PROGRAMMER/ANALYST

Requires extensive experience in the design end implementation of applications in an IBM OS/MVT or VS environment using MARK IV, COBOL, FORTRAN, TSO, IMS, IBM 3790 programming helpful.

SYSTEMS PROGRAMMERS

Requires experience in one or more of the following areas: Operating systems (MVT/HASP, MVS/JES2). Hardware/software performance measurement. Data Base management systems (IMS/VS DB/DC) and telecommunications (VTAM, NCP, 3790).

OPERATIONS SERVICES

COMPUTER UTILIZATION ANALYST-Requires experience in analysis of SMF and other systems-produced utilization data; use of application program evaluation/optimizing tools, extensive background in 370 OS JCL/Utilities and TSO; plus experience with MVS, distributed processing, end COBOL or MARK IV programming. Operations background helpful.

TECHNICAL SUPPORT ANALYST-Requires experience in providing high level technical and procedural support to users in closed-shop environment; sound computer system production background and communication skills; and extensive experience with 370 OS JCL/Utilities MVS TSO and distributed processing.

TECHNICAL WRITER

Requires experience in developing and writing technical standards and procedures to support a standards program. Sound computer systems background and communications skills with technical and non-technical users a must. Submit with your resume a sample of your work.

We offer excellent salaries, benefits and growth opportunities. Send resume including salary history in strict confidence to: J.R. Brune,

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SYSTEMS

Senior Openings with Inviting Career Potentials

Expansion of our Systems staff creates several openings, all based in Wilmington, Delaware.

Basic requirements include at least 5 years of solid experience in an OS environment, and heavy background in IMS Data Base design and implementation. BS/MS in CS or a technical field is desirable.

The assignments will involve development of on-line IMS systems, MVS/JES-3 enhancements for 370/158/168 systems, TSO and APL enhancements for Financial Planning Applications, Program Development, and Production Modeling, and development and enhancement of a nationwide RJE and message switching communications system.

Senior Systems Programmers/ Projects Leaders

These positions will utilize your abilities in written and oral communications skills and for Project Leadership.

Data Communications Systems Specialist

Substantial experience in message switching and data communications is required.

Please send resume detailing experience in pertinent areas, in confidence to:

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Wilmington, Delaware 19898

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Graduate study in Business Management, Math, and Accounting. Applied experience with Basic, CDBDL, or PL/I Langugaes. Operational experience with a disc system and a remote time-sharing system. Apply Personnel Office, Delta College, University Center, Michigan 48710

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COMPUTER SCIENCE:

University of South Carolina, Department of Mathematics and Computer Science, Columbie, South Carolina, 29208. There is a possibility we will have a position at the renk of professor in computer science, with a starting date of Januery, 1978 or September, 1978. Have vita, four recommendations and pertinent material sent to R.M. Stephenson, Jr., Chairman

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PROGRAMMER

Growth position on corporate programming staff of diversified Fortune 500 corporation. Assignments will include business application projects. Applicant should have e strong ADPAC and 370 DDS V/S and JCL background. Knowledge of CDBDL and CICS experience desirable.

Salary commensurate with experience. Excellent benefits and working conditions.

Send detailed resume in confidence to: Personnel Manager
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P.O. Box 5130
San Jose, CA 95150
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EOE M/F

PROGRAMMER ANALYSTS

COME ENJOY THE GOOD LIFE IN SAN DIEGO

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Immediate openings in these areas

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- DIAGNOSTIC PROGRAMMING
- PERFORMANCE MEASUREMENT

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- SOFTWARE CONFIGURATION MANAGEMENT

(Design, develop programs to support softwere testing, release end repair).

- SOFTWARE DEVELOPMENT

(Design/implementation of multi-program O/S in a high level lenguage. Experience desired in data base or telecommunications, distributive processing, virtual mechine, time sharing).

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below.

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Data Processing Division
16575 W. Bernardo Drive
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Thinking of a Change? If so, you owe it to yourself to talk to one of the top EDP recruiters in the country. Client companies assume all fees. Openings are located nationwide and encompass all industries.

Immediate needs include:

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Relocation and Excellent Benefits.

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Visiting, teaching position in undergraduate computer science and information systems curriculum (theory, systems analysis, OR, numerical enalysis, non-numeric processing, computer architecture). Doctorate preferred, Master's considered. Rank and salery dependent upon quelifications; to begin fall semester. Potsdam is located in the St. Lawrence Valley, north of the Adirondack Mountains. Apply with credentials by Aug. 10 to: Dr. Donald Burlingamb, Box 620, S.U.N.Y., Potsdam, N.Y. 13676. An Equal Opportunity/Affirmative Action EMployer

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Systems Project Manager

Personnel Applicant Tracking System

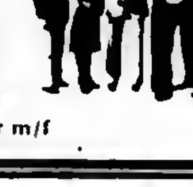
Our constant growth and expansion has resulted in a commitment to design and install an applicant tracking system that will serve as an important tool in supporting the employment efforts of the Corporation.

In addition to assuming the design, budgeting, scheduling, hiring, and project management responsibilities for the system, the person we are looking for will also be responsible for supervising the Personnel Systems technical support staff.

Ideally, you have had previous Project management responsibilities involving a large volume of transactions in a multi-location setting and have an in-depth technical background utilizing both small and large scale computers. Knowledge of a sophisticated data base language is desirable.

If you are interested in this responsible high-visibility opportunity, please submit your resume and salary requirements to Randy Shaw, Digital Equipment Corporation, Department G81, 162 Main Street, Maynard, Massachusetts 01754.

We're the company looking for people.



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EDP CAREERS

The Data Processing Division of DORSEY LOVE & ASSOCIATES offers a personalized and professional service to the computer professional seeking to advance his career. We serve the Data Processing field from coast-to-coast and keep abreast of the current employment situation through constant contact with employers and our affiliates. To the person seeking to advance his career, this means a confidential job search on a continuing basis. To the employer, this means a reliable source to turn to when seeking to fill a key position. We currently have career opportunities for highly qualified programmers, programmer/analysts, systems analysts, design and software specialists, and management professionals in business, industry, and the scientific fields. If you feel that now is the time to further your career, send your personal resume or call Jeff Holmes today. All inquiries held personal and confidential.

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P.O. Box 4486, Glenstone Station
Springfield, Missouri 65804
(417) 883-1212

MMWEC

Systems Analyst/Programmer

Public power corporation establishing new position with supervisory or management potential. Degree in computer technology desired. Three to five years experience in multi-user environment Electric utility experience preferred. Working knowledge of Fortran, Cobol or PL/1, Basic and assembly or machine level computer languages desired. Harris Model 120 Computer to be installed in August, 1977.

Forward resume and salary history to:

Massachusetts Municipal Wholesale Electric Company
P.O. Box 426
Ludlow, Mass. 01056
Attention: Comptroller

PROGRAMMER/ANALYSTS

CIBER, Inc. (Consultants in Business/Engineering/Research) is searching for experienced D.P. specialists to help us grow. If you have two or more years experience in medium or large scale operating systems, CIBER can offer:

A firm that is employee oriented.

Varied project assignments while retaining employment continuity.

A firm embarking on en ambitious internal educational program.

A firm committed to advancing from within its ranks.

A firm that will help you to improve old skills and develop new skills.

A benefits plan (fully paid) that is a model for the EDP service industry. These benefits include vacations, paid holidays, incentive compensation, life insuarnce, dental insurance and medical insurance.

A firm that provides scheduled reviews and meritorious salary increases.

A firm that will help you achieve financial and personal rewards.

Our service areas include utilities, oil and gas, manufacturing, automotive retail and financial institutions. Many of these areas utilize on-line data base processing, structured design and programming, CICS, IMS, IDS, VSAM, MARK IV and PANVALET.

financial institutions. Many of these areas utilize on-line data base processing, structured design and programming, CICS, IMS, IDS, vSAM, MARK IV and PANVALET.

If we sound interesting to you, send your resume, or call. We'll show our interest in your future by having one of our staff discuss these and other edvantages you could enjoy through employment with CIBER.

All recruiting is conducted through the corporate headquarters in Bingham Farms, MI.

Corporate Headquarters
30400 Telegraph
Suite 386
Bingham Farms, MI 48010
(313) 642-2900

With Branch Offices In
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Is your career growing places?

Or are you STAGNATED in a grow-nowhere position designing and programming for the same routine applications? Give your career a shot of professional stimulation by playing an integral role in developing exciting new applications in the areas of criminal justice, health, social services and general government. Hennepin County's commitment to new development has resulted in a rapid expansion of data processing staff. We offer diversity in duties, excellent opportunity for promotion to advanced positions, salary commensurate with experience, and an outstanding fringe benefit package. Interested in joining a progressive data processing team in a state of the art environment (IBM 370/168 MVS, IMS)? Explore these opportunities:

- **SYSTEMS ANALYSTS**
  Conducting feasibility studies and requirements analysis and other analysis/design duties in new applications areas. Requires 4 years in applications development including analytical design.
- **PROGRAMMER ANALYSTS**
  Combining technical programming duties with entry-level systems analysis and design. Requires 2 years comprehensive programming experience.
- **PROGRAMMERS**
  Developing new applications to solve management information problems in many expanding areas. Requires one year COBOL programming experience.

Make that significant change now. Send your resume (including employment dates and salary history) in confidence to:

Carolyn J. Hollmer
Hennepin County Personnel
A-3 Government Center
Minneapolis, Minnesota 55487

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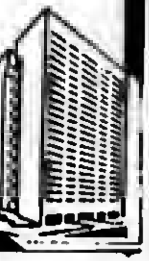

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PROGRAMMING WITH A CHALLENGE

Does your present job challenge you—honestly? Programming for the "We mean business" medical computer company can be stimulating, individual and rewarding.

Application Programming
Responsible for: Analysis-Design-Programming of On-line Distributive System
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Hardware: IBM 370/370 DOS Environment
Qualifications: 1-3 Years Applications Experience-Strong COBOL Background-Exposure to Data Base Concepts-Good Oral and Written Communication Abilities

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Background: Hardware-Software IBM 360/370-Teleprocessing-Data Base Management-Long on Experience

If you fit one of the two opportunities listed, and if you are looking for a career opportunity with a Dynamic nationwide corporation providing data processing management services to the medical industry, AND if you want to relocate to a clean, family-oriented community with good schools and churches, but close to the big cities yet have immediate access to year-round vacation spots, then . . . please submit a resume and letter with your salary requirements to:

Chuck Mills, Personnel Manager
Computer Consulting Service, Inc.
P.O. Box 1278
Dubuque, Iowa 52001

SYSTEMS
OPPORTUNITIES

TRW MISSION, a progressive Houston manufacturer of oilfield and industrial products, has several interesting opportunities for senior-level systems professionals.

SENIOR PROGRAMMER ANALYST

Heavy experience with ANS Cobol required; ALC ability desirable.

SENIOR SYSTEMS ANALYST

2 positions at the project-leader level requiring strong background in manufacturing applications such as inventory control, MRP, shop floor control and manufacturing cost.

TRW MISSION is conveniently located in suburban northwest Houston, near good schools and housing. Our company offers excellent career challenges and fringe benefits. Qualified applicants should forward a detailed resume to W.B. Usher at P.O. Box 40402, Houston, Tx. 77040.

TRW Mission
TRW Mission Manufacturing Company a Division of TRW Inc

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Faculty Position
Business Systems Application

Requirements: Masters Degree plus significant industrial experience in project management, systems analysis, and Cobol. Other areas such as data base, micro-miniprocesses, networks, software, other languages helpful.

Starting: September 1977; **Rank:** Assistant Professor;

Salary: to $15,000; Apply to: Dr. Myron E. Lewis, Buffalo State University College, 1300 Elmwood Avenue, Buffalo, New York 14222.

MIAMI-DADE COMMUNITY COLLEGE

Systems Programmer

Responsible for systems generation, maintenance and development of the SHADOW II teleprocessing monitor; back-up programmer on the college's ITEL AS/5-3 CPU.

Qualified applicants must have in-depth experience with OS/MVT or SVS/HASP systems programming and with IBM 3270, SHADOW II, CICS or other major teleprocessing package. Bachelor's degree in appropriate field from an accredited institution and three years of experience or an equivalent combination of education and experience.

Systems Analyst

Responsible for the computer systems analysis and programming effort in a functional area. Bachelor's degree, preferrably in Computer Science or related field and four years of applicable experience required.

Programmer Analyst

Task oriented work involving determination and selection of optimum methods for data processing problems solving. Proficiency in COBOL, experience and/or training in IBM 370 Language. Associate degree or equivalent and three years experience in developing programming and computer systems.

Salaries competitive based on position. Liberal employee benefits. Submit detailed resume including title of position(s) and salary requirements to Personnel Serivce, Miami-Dade Community College, 11011 S.W. 104 Street, Miami, Florida 33176

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Programmer/Analyst 2-3 years Trust Systems. 370/OS COBOL or ALC	**16K**
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Programmer/Analyst 1-2 years ALC. Banking or Accounting applications	**15K**
Sr. Programmer/Analyst 3+ years Loan Systems. COBOL/ALC. CICS Preferred.	**19K**

DUNHILL
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of Fort Worth, Inc.
901 Ridglea Bank Bldg.
Fort Worth TX 76116
(817) 732-8191

SYSTEMS ANALYSTS

Large Cooperative Food Distributor, located in Central Flordia, is seeking (2) two senior systems analyst to develop financial and distribution applications. Positions require 3-5 years experience in the design of teleprocessing oriented systems. Knowledge of DOS/VS, CICS, Cobol is highly desirable.

Send resume including salary history to:

Don Burt
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Ocala, Fla. 32670

NORTH CAROLINA SOUTH CAROLINA

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PROGRAMMERS ANALYSTS

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A youthful organization of highly skilled d.p. professionals, we are seeking to expand with the addition of programmer trainees, programmers, and programmer analysts.

aci offers top salaries, excellent benefits and a constant challenge in a multi-faceted environment encompassing virtually all hardware, software, languages and applications.

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PROGRAMMERS

Dynamic data entry systems manufacturer requires Programmers with 3 years minimum experience in a minicomputer assembly language environment, preferably with I/O driver design and operating systems background.

An outstanding compensation plan, opportunity for professional growth, excellent benefits makes this progressive young company a very desirable place to grow.

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SENIOR
SYSTEMS ANALYST

Rapidly growing Kansas City insurance company is seeking an experienced Systems Analyst to act as project leader responsible for the development of our computer systems. Excellent opportunity for an individual with property and casualty insurance experience (American Agency desirable) in development and installation of IBM Systems - 3 and 370 series hardware.

Send resume to: Ed Wallis, Mid-America Fire and Marine Insurance Company; P.O. Box 19757; Kansas City, MO 64141 or call (816) 756-3600.

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DATA PROCESSING
PROGRAMMER - ANALYST
POSITIONS

Expanding computer applications in rapid growth company has created several additional openings in our Data Processing Division.

- Career Positions
- Professional Work Environment
- Individual Growth and Development

Two to six years experience in Systems and/or Programming is necessary. H-600/6000/66, COBOL, IDS, TDS & GMAP desirable but not mandatory. Experinece in Teleprocessing and On-line Data Base applications would be an asset. A four year college degree is preferred. Excellent salary structure and fringe benefit program. Please submit resume with salary history in confidence to Personnel Manager:

FS SERVICES, INC.
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Large-Scale Opportunities in Advanced-Technology EDP Systems Development

SENIOR SOFTWARE SPECIALISTS

Several positions are currently available consisting of the development of a very large distributive processing system and will include advanced state-of-the-art technology. Will utilize the entire spectrum of EDP equipment from mini's to large mainframe and a large assortment of associated peripherals and other devices, i.e. terminals, etc. Minimum of 5 years' experience in the development of systems software with the preponderence of this experience in telecommunications, networks and file processing, plus a background in operating systems, plus expertise in COBOL and assembly languages necessary with strong preference for a related degree.

COMPUTER SYSTEMS PERFORMANCE ANALYST

Newly created positions exist for persons who will specify performance goals and implement methods to assure goals are met for ON-LINE SYSTEMS. Additionally, specify performance instrumentation and monitor system performance throughout system development, and develop system performance models. We feel these tasks can best be performed by someone who has had some experience in system performance evaluation and transaction processing systems. Knowledge of, or work with synthetic benchmarks, data processing systems and system performance instrumentation would be an asset.

If you are interested in being considered for one of several new positions with us, please send your resume and salary history/requirements to Thom Harris.

NCR

Special Systems Division

4046 Sorrento Valley Blvd.
San Diego, California 92121

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NORTHEAST UTILITIES
OPPORTUNITIES FOR COMPUTER PROFESSIONALS IN-
BUSINESS COMPUTER APPLICATIONS:

SYSTEMS PROGRAMMER

We are seeking Systems Programmers with a TP background to work in a rapidly growing TP environment. We are a 370-168/158 MVS shop with CICS, TSO and TCAM applications.

ANALYST PROGRAMMERS (and above)

We have openings for experienced individuals who have a proven track record in large application systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budget, within specifications, you may like the challenges.

PROCESS COMPUTER APPLICATIONS:

We are seeking qualified individuals to meet an expanding process computer work load. Our Process Computer Section serves the diverse needs at Northeast Utilities for real-time, sensor-based computer systems. The implementation philosophy is that of an internal systems house with full system supply responsibility; from initial hardware system specification to system functions application through hands-on programming. Two large projects are in the initial project phase. Both utilize multi mini CPU networks, closely coupled, in distributed/hierarchical system configurations. One is an inplant, nuclear powerplant dacqs/monitor system, network software driven, with redundancy through load sharing. The other is a power control center AGC/SCADA system. Color graphic display concepts are employed on both projects.

Applicants shall have up to 3 years experience in process computer application; Engineering degree is essential; familiarity with large process operation and dynamics is desirable.

ENGINEERING COMPUTER APPLICATIONS:

We have an opening in our Computer Systems and Programming Application Section for a qualified individual interested in scientific software development. This Section develops and supports the software requirements of the Transmission and Generation Planning Departments, the Electrical Design, Mechanical and Nuclear engineering Departments and the Distribution and Operating Departments of Northeast Utilities. Presently, programs are implemented on an IBM 370/158 using MVS. All program development is accomplished via IBM 3270 CRT terminals under TSO.

Applicants should have as minimum a BS degree in Engineering or Computer Science, and a working knowledge of either FORTRAN or PL1. Electric utility experience is desirable.

Please apply in writing with educational, employment and salary history to

Mrs. Linda Heidenis
NORTHEAST UTILITIES SERVICE COMPANY
P.O. Box 270, Hertford, CT 06101
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computer hardware and software candidates...

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We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

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Evansville, Indiana 47715
(812) 477-5531

COMPUTER CAREERS INC.
Specialists-Data Processing
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Suite 503
Bethesda, MD. 20014
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Computer Science Instructor

A temporary position is open for an Instructor in Computer Science at Mississippi State University for the period September 1977 thru May 1978. M.S. degree in Computer Science is required as a minimum. Salary open.

Send resume to:

Dr. Fred Davis, Director
Division of Numerical Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

MSU does not discriminate on the basis of, race, color, religion, national origin, sex, age or handicap.

ANALYST/ PROGRAMMER

Small midwest private high school has opening for DP manager. Presently operating a Basic Timesharing computer for business purposes, and an HP-3000 for academic, development, and business applications. Pleasant small town atmosphere. Educational and recreational privileges for you and your family. Contact Business Manager, Culver Military Academy, Culver, Indiana 46511 or phone (219) 842-3311, Ext. 220.

SENIOR SOFTWARE MANAGEMENT

Very attractive positions for those having experience in DESIGN, DEVELOPMENT & APPLICATION of real-time software systems.

Must also have experience in directing major software development projects and supervising design personnel. A technical degree and ability to work effectively with non-software managers necessary.

Pleasant medium sized midwest city. Send your resume or letter of interest in complete confidence to CW Box 5123, 797 Washington St., Newton, Mass. 02160.

equal opportunity employer

PROGRAMMER ANALYST

Continuing expansion has created an immediate need for a Data Processing Professional. The Evanston Hospital, located in north suburban Chicago, is a multi-site health care organization affiliated with Northwestern University McGraw Medical Center. This position requires 4 years Programming experience with at least 2 of them being with IBM/370/DOS/VS and ANS/COBOL/VS. Experience in the following application areas desirable:

Financial Systems; - Order Entry; - Billing; - Inventory

CICS/VS is a definite plus. Evanston Hospital offers excellent growth opportunities with a comprehensive benefit and salary package. If you are interested in discovering more about this dynamic organization and this outstanding opportunity, please call collect or write:

(312) 492-4600, Personnel Department, Evanston Hospital, 2650 Ridge Avenue, Evanston, Illinois 60201

EOE M/F

EDP Systems Professionals

Booz, Allen & Hamilton Inc., a worldwide leader in management consulting, is seeking experienced EDP Systems analysis for its New York City consulting staff.

The individuals we seek will be assigned to top management-oriented projects dealing with the development of advanced applications systems. These systems enable our clients to solve a broad spectrum of business, technical and organizational problems.

The professionals we are looking for should possess a college degree and minimum of 3 years computer applications experience in at least one of the foloiwng areas:

HEALTH CARE SYSTEMS

- Policyholder, subscriber, and provider information
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- Claims adjudication and administration
- Performance and cost reporting

LIFE INSURANCE SYSTEMS

- Underwriting, sales support and policy issue.
- Policy administration and premium billing/accounting
- Valuation and management reports.

PROPERTY AND CASUALTY SYSTEMS

- Rating and policy issue
- Claims and loss reserves
- Policy administration
- Premium/loss information and management reports

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3 or more years experience programming teleprocessing applications in a manufacturing environment. Will be required to direct activities of a programming (3-5). Attractive candidate will have experience in IBM, 370/145 DOS/VS, Total Data Base, Environ-1, Power, COBOL, LIBRARIAN. Degree required. 19-25K

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If you have experience in large-scale business applications, or technical systems experience including real-time inquiry processing, on-line and batch database systems, we invite you to investigate these exceptional career opportunities in a highly professional and stimulating environment. A comprehensive benefit program is offered, and salaries are commensurate with your level of expertise and contribution.

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We offer an excellent package of compensation commensurate with experience, full benefits and highly visible opportunities for career and professional growth. Send resume, salary history, and requirements to:

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Programming and systems design in a manufacturing environment with IBM System/3.

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We seek an individual with a broad background with the System/3. A thorough knowledge of systems design, programming and the ability to supervise a department is required.

If you feel you are qualified, send your resume, with current earnings, to the Director of Personnel, Department JAT.

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The University offers a competitive benefits package w/optional paid coursework & optional 4/day work week. Salaries are avail. to 24k+, DOQ.

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WICK building systems inc.

SENIOR PROGRAMMER

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FACULTY POSITION IN BUSINESS DATA PROCESSING. The Data Processing Department welcomes applications for a faculty position available September 7, 1977. A Bachelors degree required, Masters preferred. Three years business data processing experience is required. Rank and salary dependent upon qualifications. Requires strong interest in undergraduate instruction and ability to teach courses in the following areas: Systems Analysis and Programming Languages (COBOL, 360/370 ASSEMBLER, FORTRAN & RPGII). Send complete resume to Professor Stuart J. Travis, Head, Department of Data Processing, Ferris State College, Big Rapids, MI 49307

AAA/EOE

DATA PROCESSING

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M.S. or PhD in Math, Physics, Computer Science, or Engineering, and experience in analysis of engineering systems.

Programmers
B.S. in Computer Science, Math, Physics, or Engineering and programming experience with higher order languages such as Fortran, Pascal or PL/I. Both scientific and real-time programmers are required.

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M.S. or PhD in Computer Science and three years experience in development of programming languages, compilers, translators, assemblers and link editors.

Send your resume in confidence to
Staffing Manager/P.O. Box 6015, M.S. 222/Dallas, Texas 75222.

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available beginning in January, 1978. Faculty rank; salary: DOE/QUALS. Duties include undergraduate instruction in systems programming, computer architecture and business systems analysis as well as curriculum development. Minimum educational requirement is a Master's degree in Computer Science or equivalent. Industrial experience preferred. Please send resume (including references) by November 15, 1977 to: Robert S. Shaak, Chairperson, Department of Mathematics and Computer Science, Millersville State College, Millersville, Pennsylvania 17551. Millersville State College is an EO/AAE.

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Qualified candidate will possess a college degree, preferably in data processing, and a minimum of three years experience in system analysis. COBOL is a must. At least one year's experience as an EDP Auditor is preferred. Send resume establishing qualifications, employment and earnings history, and salary requirements to:

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The University of Michigan — Flint

PROGRAMMER ANALYST

Responsible programming experience (PL/I, FORTRAN & COBOL), knowledge of operating systems. Bachelor's degree is required, Master's is preferred. Work with faculty, staff, and students. Send resume to:

Dr. Samir Kamat
Director, Computer Center
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Because of our size and number of offices, most of our consultants average less than 20% travel.

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You must be experienced with ASSEMBLER language on our DCC-116 or Data General's NOVA line. The ideal candidate will be familiar with operating systems and the interfacing of peripherals. We offer a competitive starting salary and a full range of company benefits.

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Submit resume including salary requirements by August 15, 1977, to Daniel J. Helmerich, Manager, Administrative Systems

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Newark, DE 19711
AEO/AAE

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A major position responsible for planning, development and documentation of functional requirements consistent with marketing requirements, state-of-the-art technology, current product line and planning as it would relate to future product lines. The individual we seek should have a minimum of a BSEE (MSEE preferred) plus 5 years' exposure in the design of digital computers. An aptitude for technical writing would be of tremendous value in accomplishing position goals. This is a systems management position.

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We require a senior marketing manager to direct market penetration and primary product development of the S-100/S-200 and related VULCAN. An experienced hardware and peripheral sales background coupled with a capacity of product planning, communications, forecasting and competitive analysis will be helpful. A degree is perferred plus a proven sales track record.

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There are two software instructor positions available which require proven experience in the documentation and teaching of operating systems, language processors and data base management. A BS degree with 2 years programming experience in industry or commerce as well as communications skills are required.

CSD is one of the most rapid growing divisions of Harris Corporation. Career opportunities exist and will continue to present themselves due to rapid expansion.

Send your resume and salary history in strictest confidence to W.D. Taylor, Harris Corporation, Computer Systems Divison, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

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Unique Opportunity With Rapidly Expanding Firm

AMS seeks an experienced, creative software development professional to fill a key position in our software development group. This group supports our business by developing generalized software for use in financial, order entry, order processing and inventory control applications.

Starting in 1970, AMS has expanded into a nationwide systems consulting and development firm; annual sales for 1977 are projected at $20 million. To sustain our tremendous growth, AMS has established several large projects for developing software which forms the basis for our proprietary products. At present, our focus in on the DEC PDP-11 using RSX-11M.

The person we seek must have demonstrated success in design and implementation of sophisticated, generlized software such as DBMS, procedural languages, decision-table processors and report writers. The key quality is the creative design and implementation of software which is to be used as the foundation for application products.

AMS salaries are in the upper range for the industry, and the starting salary will be commensurate with experience and qualifications. There is opportunity for rapid advancement, profit sharing and stock options; the working environment is exceptional — a talented, creative team; dedicated computers and terminals.

If you believe you are one of the best in this field, please send us your resume and we will respond promptly. We want to fill this position as soon as possible but not later than September 1.

Frank A. Nicolai
Executive Vice President
AMERICAN MANAGEMENT SYSTEMS, INC.
1515 Wilson Boulevard Arlington, Virginia 22209

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An Equal Opportunity Employer M/F

SYSTEMS ANALYSTS

Professional Growth

Your capabilities will be appreciated and well utilized in the M.I.S. Department of our nationally prominent northern New Jersey-based corporate computer center. Here you'll collaborate with a first-rate team of computer professionals working toward state-of-the-art business applications. We seek candidates with automated financial systems analysis experience, extensive user contact background, programming experience including COBOL and RPG, and, preferably, familiarity with software package installations. You can look forward to a starting salary to $23K, a broad benefits package, challenging assignments, ever-increasing responsibility and unique growth opportunities with a rapidly expanding organization. Send resume including salary history in confidence to

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Four-Phase Systems
Advanced Technology for Distributed Processing

DATA BASE SYSTEMS

Definition, Planning & Design

Michigan Consolidated Gas Co., the largest natural gas distribution company in Michigan, is looking for innovative problem-solvers with in-depth experience in phased conversion to a data base. Working in a 360/370 environment, you will be responsible for the development of long range systems plans within a data base framework.

Preferred candidates will possess a Master's degree in Computer Science, Systems Management or Management Science with experience in designing software for management systems, including large scale data base. The ability to work independently and good communications skills at all technical and management levels are also important.

We offer a very competitive salary, excellent benefits and the growth potential of a major member of the energy community. Please send your resume including salary history and requirements to N. Shaed, Professional Placement, Michigan Consolidated Gas Company, One Woodward Avenue, Detroit, Michigan 48226. We are an equal opportunity employer m/f.

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The Software Documentation people we're looking for probably aren't looking for a job.

We're the Digital Software Documentation Group, a proud collection of Writers and Editors. We like being part of this organization, not just because Digital is an important computer company, but because we're important to Digital.

We are on an equal footing with the Software Development organization, not a step below it. This is reflected in our salaries, our autonomy, our enthusiasm, and our corporate clout. We're not used to getting a lot of empty promises. What we do get is the necessary funding for our projects and enough freedom to produce the kind of documentation end-users can really sink their teeth into.

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Immediate opening in an expanding Southeastern New England manufacturing firm for an individual with a minimum of three years in programming with emphasis in Systems Design. This individual will be involved in both systems design and programming. The environment is a S/370, operating under DOS/VS with Tele-Processing in the near future.

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Mr. D.P. McCONNELL
Director of Corporate Personnel
Mohawk Data Sciences
1599 Littleton Road
Parsippany, New Jersey 07054
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MDS

SYSTEMS ANALYSTS PROGRAMMERS

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Dennis Schreg, Chr.
ATECC
C/O Northern Trails
Area Education Agency
Box M
Clear Lake, IA 50428

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MATHEMATICS DEPARTMENT
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RIVER FALLS
RIVER FALLS, WIS. 54022

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Dept. of Mathematics
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River Falls, Wisc. 54022

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Programmer

SYSTEMS PROGRAMMER

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Send resume with salary history to:

Stanford Center for Information Processing

c/o C.W. Coulter
Encina 30
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1211 Westshore, Suite 100
Tampa, Fla. 33607
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Prefer a degree and minimum 2 years experience which must include programming in an ANS COBOL, OS, JCL environment. Assignments will involve some travel and have user contact at both plant and staff levels.

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Degree and manufacturing systems background with a minimum of 3 years experience. Both design and development opportunities. Experience must include programming in an ANS COBOL, OS, JCL environment. Must be able to deal effectively with line and staff functions in coordinating their systems requirements.

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Responsibilities will include the design, development and implementation of scientific-oriented computer applications.

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data processing

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We offer an exciting work environment, good compensation, liberal benefits and opportunities for advancement in software development sales management. For consideration send resume or call collect:

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Systems Performance Products. Newly created positions in Chicago and New York, You'll work with software marketing experts learning to sell our highly successful group of OS and OS/VS performance-oriented products. Prefer sales oriented individuals with technical backgrounds, solid communication skills, and 1-2 years exposure to IBM OS systems.

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Work with our Headquarters Marketing group to coordinate overall product advertising/promotion. Requires an energetic, results-oriented individual with solid communications skills and 2-3 years exposure to programming, software marketing, or sales. Marketing degree preferred.

All positions offer the opportunity to travel. Qualified candidates should call or write: Marketing Recruiting, Capex Corporation, 2613 N. 3rd Street, Phoenix, AZ 85004, Phone: (602) 264-7241

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SYSTEMS PROGRAMMER (IBM S/370-158)

The State University of New York (SUNY) at Binghamton seeks an individual with a minimum of 2 years experience in systems programming. Experience should include SCP generation, program product installation and maintenance, and proficiency in BAL and PL/I. MVS experience a plus. Minimum of a bachelor's degree required.

SUNY-Binghamton is one of four university campuses in the State University of New York System. The campus of 9,300 students is located near a variety of recreational and cultural resources. A competitive salary ($13,500-$16,000) and oustanding benefit package are being offered.

Please send resume and salary requirements by August 15, 1977 to:

Allan R. Getman
Associate Director
Computer Center
SUNY-Binghamton
Binghamton, New York 13901

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The University of Alabama in Huntsville welcomes applications for the computer science faculty position on tenure track, available September 1, 1977, at rank of Assistant or Associate Professor depending upon experience and qualifications; deadline for application is August 15, 1977. A Ph.D. in computer science or allied areas is required. Academic and/or computer-related industrial experience is preferred. Responsibilities will include teaching and thesis advisement in one or more of the following areas (in order of preference): Artificial Intelligence, Operating Systems, Microcomputer and its Applications, Computer Architecture, Oata Base Management, and Software Engineering. Send resume and transcripts along with names and addresses of at least three references to:

Computer Science Program
The University of Alabama
in Huntsville
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Huntsville, AL 35807

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System Programmers

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Technology development would include experience in one or more of the following disciplines:

- Data base management/distributed processing,
- Image processing,
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Experience in real-time communication systems with experience in one or more of the following:

- Packet switching
- Security kernel
- Operating systems
- Test and diagnostics
- On-line/off-line T&D routines
- Integration & testing of real-time systems

For consideration, please send resume with salary history/requirements to Professional Employment, Dept. JJL-32. U.S. citizenship required.

Ford Aerospace & Communications Corporation
Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303

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PROGRAMMERS

software design opportunities

PROGRAMMER/ANALYSTS

Lexar Corporation, developer of sophisticated micro-processor based telecommunications and word processing systems, has several openings for outstanding Programmer/Analysts. Applicants MUST have recent experience programming realtime, on-line systems utilizing assembly language on micro or mini computers. The positions will entail the design and development of software systems including coding, debugging and documentation.

If you enjoy working with advanced technologies and bright people in an informal atmosphere, please send your resume and salary history to:

Susan Davis
Personnel Manager

LEXAR CORPORATION

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Harris Corporation, Data Communications Division, a leader in data communications, seeks

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SAN FRANCISCO & CHICAGO areas

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We offer an excellent salary, complete benefits package, and a good potential for future career growth.

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Carole Burns (214) 620-4196

or send resume including salary history and requirements to her at: Harris Corporation, Data Communications Division, P.O. Box 44076 Dallas, TX. 75234

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For confidential attention, please send resume to:

Director of Personnel
Western Kentucky University
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Responsibilities will include operational control of the University's data base and management information systems, develop standards for data elements and structures, and assure the quality control of application programs. The data base is presently under development and the first module is expected to become operational in July. Requires a Master's Degree in computer science, or a computer-realted discipline, at least four years of programming/analysis experience including the design and implementation of data bases, and a strong ability to communicate with administrative personnel. Knowledge of and experience with DEC system 1080 and DBMS-10, MCS-10 will be highly desirable. Send resume to Mrs. Betty Miles, University Personnel Services, University of Louisville, Louisville, Kentucky 40208.

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Requires 5 or more years of demonstrably successful experience in managing and implementing manufacturing systems including inventory management, capacity planning, engineering and labor control. A background that includes data base management systems and techniques on any computer is a definite plus.

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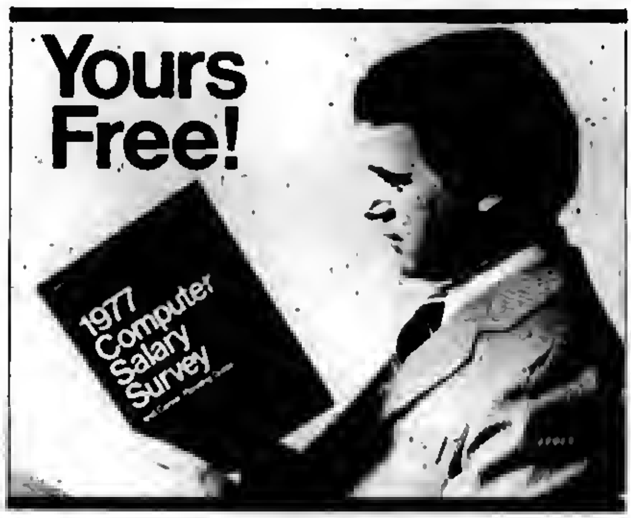

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Wash., D.C.	703/790-5810		
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Chicago	312/782-0857	Encino, Ca.	213/995-8868
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Minneapolis	612/544-3600	San Francisco	415/434-2410
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(When writing, please be sure to indicate home address and current position title.)

If unable to call, write:
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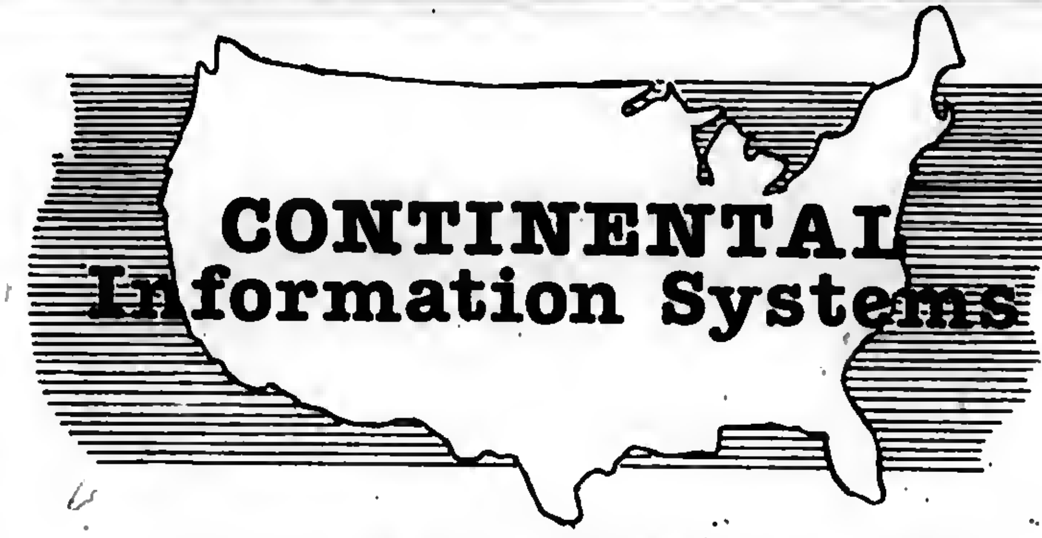

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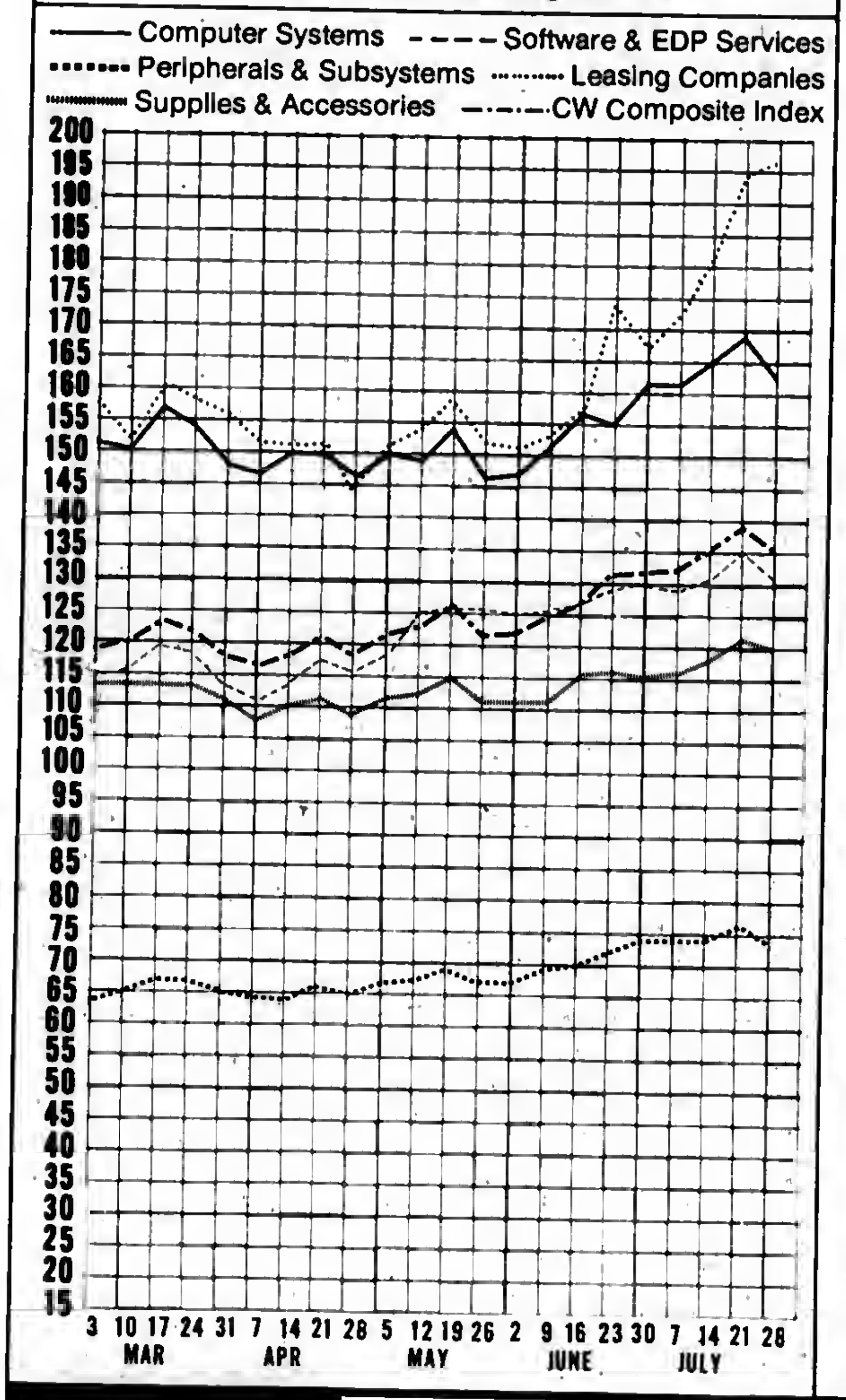
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

CCI
Yeer Ended April 30

	1877	1876
Shr Ernd	$.77	.....
Revenue	174,020,000	$128,068,000
Eernings	3,538,000	(942,000)

COGNITRONICS
Three Months Ended March 31

	1977	1078
Shr Loss	$.04	$.06
Revenue	1,182,172	858,771
Loss	82,434	88,225

COMPUTER CONSOLES
Three Months Ended March 31

	1977	1078
Shr Ernd	$.20	$.16
Revenue	8,312,336	2,948,840
Tex Cred	01,500	.....
Earnings	375,586	288,006

COMPUTER ELECTION SYSTEMS
Yeer Ended March 31

	1877	1978
Shr Ernd	$1.14	$.90
Revenue	12,583,081	8,148,352
Earnings	1,419,335	1,080,357
3 Mo Shr	.20	.85
Revenue	3,171,088	3,807,123
Eernings	248,488	788,580

COMPUTER NETWORK
Yeer Ended March 31

	1977	1878
Shr Ernd	$.44	$1.02
Revenue	7,348,903	8,890,877
Spec Cred	70,018	641,780
Tex Cred	511,158	688,730
Eernings	580,174	1,330,519

GENERAL AUTOMATION
Three Months Ended April 30

	1877	1078
Shr Ernd	$.08	($.57)
Revenue	20,482,000	14,518,000
Earnings	208,000	(1,425,000)
9 Mo Shr	.58	(.50)
Revenue	81,554,000	47,804,000
Eernings	1,486,000	(1,232,000)

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 27, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 27 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	0- 39	31 1/4	-1	-3.1
N	BURROUGHS CORP	55- 91	66	-2 5/8	-3.8
O	COMPUTER AUTOMATION	18- 28	26 1/4	- 1/2	-1.8
N	CONTROL DATA CORP	20- 26	21	-1 5/8	-7.1
N	DATA GENERAL CORP	35- 50	46 1/8	-3 3/8	-6.8
N	DATAPOINT CORP	18- 30	26 5/8	- 3/4	-2.7
N	DIGITAL EQUIPMENT	37- 53	46 3/8	-2 3/8	-4.8
N	ELECTRONIC ASSOC.	2- 3	1 7/8	- 1/8	-6.2
A	ELECTRONIC ENGINEER.	8- 10	8 3/4	0	0.0
O	FOUR-PHASE SYSTEMS	13- 17	15	- 1/4	-1.6
N	FOXBORO	42- 54	47 3/8	- 1/8	-0.2
O	GENERAL AUTOMATION	6- 9	7	- 3/8	-5.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	79	-3 1/4	-3.9
N	HONEYWELL INC	44- 55	51	-2 5/8	-4.8
N	IBM	245-286	267 1/2	-5 1/2	-2.0
O	MANAGEMENT ASSIST	5- 9	6 1/2	- 1/4	-3.7
O	MEMOREX	23- 29	26 3/4	-1 1/4	-4.4
O	MICRODATA CORP	7- 18	9 1/2	- 3/8	-3.7
O	MODULAR COMPUTER SYS	5- 8	7 1/2	- 3/8	-4.7
N	NCR	32- 43	42 1/8	+ 1/8	+0.2
O	PRIME COMPUTER INC	12- 18	17 1/2	+ 1/8	+0.7
N	PERKIN-ELMER	17- 22	19 3/4	-1 3/8	-6.5
N	RAYTHEON CO	16- 33	29 1/2	-2	-6.3
N	SPERRY RAND	34- 42	35 3/4	-1 3/4	-4.6
O	SYCOR INC	8- 15	10 1/4	+ 3/8	+3.7
A	SYSTEMS ENG. LABS	5- 8	7 1/8	-1	-12.3
N	VARIAN ASSOCIATES	15- 21	18	-1 1/8	-5.8
A	WANG LABS.	14- 21	19 1/8	- 3/4	-3.7

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 27 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	10 1/4	+ 1/8	+1.2
O	COMDISCO INC	10- 13	11	+ 3/4	+7.3
A	COMMERCE GROUP CORP	2- 2	2	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
N	DATRONIC RENTAL	1- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2	0	0.0
N	DPF INC	6- 9	8 1/8	- 1/2	-5.7
N	ITEL	13- 20	18 1/8	-1 1/2	-7.6
N	LEASCO CORP	19- 27	26	+1 1/8	+4.5
O	LEASPAC CORP	1- 2	1	0	0.0
O	MRG INC	0- 0	1/4	+	+25.1
A	PIONEER TEX CORP	5- 11	5 7/8	- 1/8	-2.0
N	U.S. LEASING	10- 15	14 1/2	- 1/4	-1.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 27 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1	0	0.0
O	ANACOMP INC	7- 10	9 3/8	+ 1/8	+1.3
A	APPLIED DATA RES.	5- 10	9 1/8	- 3/8	-3.9
N	AUTOMATIC DATA PROC	23- 30	28 1/4	- 3/4	-2.5
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	10 1/4	-1 1/4	-10.8
O	COMP ELECTION SYSTMS	6- 9	9 1/4	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	6 5/8	+ 1/2	+8.1
N	COMPUTER SCIENCES	7- 9	7 5/8	- 3/4	-8.9
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	CONSHARE	5- 7	6	- 1/2	-7.6
O	DATA DIMENSIONS INC	3- 5	3 1/8	- 3/8	-10.7
O	DATATAB	1- 2	1 7/8	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	18 5/8	- 1/4	-1.3
O	INSYTE CORP	2- 3	1 3/4	- 1/8	-6.6
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	4 3/8	- 1/2	-10.2
O	KEYDATA CORP	2- 3	1 7/8	+ 1/8	+7.1
A	LOGICON	7- 17	13 1/8	- 3/4	-5.4
A	MANAGEMENT DATA	1- 2	1 1/2	- 1/8	-7.6
A	NATIONAL CSS INC	19- 25	22 3/4	-1 1/8	-4.7
O	NATIONAL DATA CORP	4- 7	5 7/8	- 1/4	-4.0
A	ON LINE SYSTEMS INC	17- 22	19 1/2	+ 1/4	+1.2
N	PLANNING RESEARCH	3- 6	5 1/4	+ 1/4	+5.0
O	PROGRAMMING & SYS	1- 1	1/2	- 1/8	-20.0
O	RAPIDATA INC	2- 3	2 3/8	- 3/8	-13.6
O	REYNOLDS & REYNOLDS	17- 20	19	- 3/4	-3.7
O	SCIENTIFIC COMPUTERS	1- 3	3 1/4	+ 1/8	+4.0
O	TYMSHARE INC	14- 23	21 1/4	- 1/4	-1.1
A	URS SYSTEMS	4- 5	4 1/8	- 1/8	-2.9
N	WYLY CORP	1- 2	1 3/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 27 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/2	- 3/4	-5.2
O	ADVANCED MEMORY SYS	7- 9	8 1/8	0	0.0
N	AMPEX CORP	8- 11	9 7/8	-1 1/8	-10.2
O	ANDERSON JACOBSON	3- 5	4 1/4	0	0.0
N	APPLIED DIG DATA SYS	10- 16	13 1/4	-1 5/8	-10.9
O	BEEHIVE INT'L	8- 12	9 1/4	- 3/8	-3.8
A	BOLT,BERANEK & NEW	7- 8	7 3/4	+ 1/2	+6.8
N	BUNKER-RAMO	8- 12	10 7/8	+ 1/8	+1.1
A	CALCOMP	3- 5	2 3/4	- 1/4	-8.3
O	CAMBRIDGE MEMORIES	1- 3	2 5/8	- 1/8	-6.6
N	CENTRONICS DATA COMP	22- 29	26 1/4	-2 3/8	-8.2
O	COGNITRONICS	1- 1	1/2	0	0.0
O	COMPUTER COMMUN.	5- 6	6 1/4	- 3/8	-5.6
O	COMPUTER CONSOLES	4- 7	4 3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	+ 1/8	+12.5
O	COMTEN	9- 13	10 3/4	- 1/8	-1.1
N	CONRAC CORP	19- 28	21 7/8	- 1/2	-2.2
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	- 1/4	-6.2
O	DATA 100	6- 9	7 1/2	-1	-11.7
A	DATA PRODUCTS CORP	9- 15	14 3/8	- 3/8	-2.5
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUM INC	1- 2	1 5/8	- 1/8	-7.1
O	DECISION DATA COMPUT	2- 3	2 1/4	- 1/4	-10.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	3 3/4	- 1/4	-6.2
O	FABRI-TEK	1- 2	1	- 1/8	-14.9
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	10	- 1/8	-1.2
N	HARRIS CORP	28- 39	35 3/4	- 3/8	-1.0
A	INCOTERM CORP	10- 15	10 1/4	- 7/8	-7.8
O	INFOREX INC	4- 7	4 5/8	- 1/2	-9.7
O	INFORMATION INTL INC	9- 14	9 1/2	- 1/2	-5.0
O	INTEL CORP	38- 57	50 1/2	- 1/2	-0.9
A	LUNDY ELECTRONICS	3- 6	5 1/8	- 1/2	-8.8
O	MSI DATA CORP	6- 10	9 5/8	+ 1/8	+1.3
N	MOHAWK DATA SCI	5- 8	5 7/8	+ 1/8	+2.1
O	PENRIL CORP	2- 5	4 1/2	0	0.0
A	PERTEC CORP	7- 9	8	- 3/8	-4.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	4	0	0.0
O	RECOGNITION EQUIP	6- 10	8 1/2	- 3/8	-4.2
O	SCAN DATA	1- 2	1 3/8	- 1/8	-8.3
O	STORAGE TECHNOLOGY	10- 15	13 1/4	0	0.0
O	T BAR INC	7- 12	11 5/8	- 3/8	-3.1
O	TALLY CORP.	4- 6	3 5/8	- 1/8	-3.3
A	TEC INC	7- 10	8 1/8	- 1/8	-1.5
N	TEKTRONIX INC	29- 37	35	-1 1/2	-4.1
N	TELEX	2- 3	2 5/8	- 3/8	-12.5
O	WILTEK INC	1- 1	5/8	+ 1/8	+25.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE JUL 27 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 7/8	+ 1/8	+7.1
A	BARRY WRIGHT	10- 14	13	-1 1/4	-8.7
O	CYBERMATICS INC	1- 1	3/4	+ 1/8	+20.0
O	DUPLEX PRODUCTS INC	14- 19	17 3/4	- 3/4	-4.0
N	ENNIS BUS. FORMS	6- 7	6 1/8	- 1/4	-3.9
O	GRAHAM MAGNETICS	11- 16	16	+1 3/4	+12.2
O	GRAPHIC CONTROLS	15- 18	17	0	0.0
N	3M COMPANY	48- 56	49 5/8	- 1/4	-0.5
C	MOORE CORP LTD	26- 37	26 1/4	-1 1/2	-5.4
N	NASHUA CORP	16- 25	21 3/4	-2 1/4	-9.3
O	STANDARD REGISTER	18- 25	22	-1	-4.3
O	TAB PRODUCTS CO	13- 19	17 3/4	- 3/4	-4.0
N	UARCO	19- 22	20 3/4	-1	-4.5
A	WABASH MAGNETICS	10- 15	12 5/8	-1 1/4	-9.0
N	WALLACE BUS FORMS	17- 21	19 1/8	- 3/8	-1.9

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First Users Pleased With Itel Swap for IBM CPUs

By Nancy French
And Ronald A. Frank
CW Staff

First users of the Itel Corp. Advanced Systems (AS) series mainframes have experienced few if any problems in replacing their IBM 370 systems, a *Computerworld* survey has found.

In all cases, the Itel mainframes were swapped for their IBM counterparts with minimal effort and the IBM operating software was totally transparent to the AS machines, users said.

Most AS users experienced throughput improvements that confirmed initial estimates and some said the Itel CPUs exceeded original projections.

Dr. Clair Maple, director of Iowa State University's Computation Center, swapped his 2M-byte IBM 370/158 for an AS/5 on May 13 in one of the smoothest conversions he said he's ever seen — "We simply unloaded the 158 and loaded up the AS/5 and kept right on running."

As for the AS/5's performance, "it's the same machine — it's completely equivalent to the IBM 370/158.

"Statistically it's showing up a little better, but I suspect some statistical aberrations are responsible for that — not anything real," he said.

The Computation Center has an unusually large scientific and research workload because the Energy Research and Development Administrations Ames Laboratory is located on the Iowa campus. To handle that load, its 158 had been running as a dual system with an IBM 360/65.

(Continued on Page 6)

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NEWSPAPER

Washington Round-Up

By Edith Holmes, CW Staff

Wiretapping 'Text' Found

WASHINGTON, D.C. — The "in thing" during the Nixon Administration, wiretapping has made a comeback in the form of a federally funded study released here recently by a congressman who is investigating the illegal use of the technique and its resulting privacy invasions.

The study provides a "how-to" lesson in the interception of a suburban residential phone, a business' data communications to a computer service and conversations over the direct dialing network between two individuals in different cities.

The document, obtained and publicized by Rep. John E. Moss (D-Calif.), is "a previously unrevealed third volume of a little

(Continued on Page 4)

HEW Probe Continues

WASHINGTON, D.C. — A $38,300-a-year federal computer project manager has been dismissed by the Department of Health, Education and Welfare (HEW) for allegedly accepting more than $3,000 in meals and trips from a company whose $7.5 million HEW contract he managed.

Edwin B. Parker III, project manager of the HEW Office of Education's automated student loan management system, allegedly received the gratuities and favors from On-Line Systems, Inc., a Pittsburgh-based firm, [CW, July 18].

In the dismissal notice sent to Parker a week ago, HEW stated he would be asked to leave in 30 days in part because he also

(Continued on Page 4)

SSA System Security Hit

WASHINGTON, D.C. — The Social Security Administration's (SSA) communications system that accesses personal information on millions of Americans is open to fraud and unauthorized disclosure of confidential data, according to a government audit recently made public by two members of Congress.

Security procedures and controls for the SSA Data Acquisition and Response System (SSADARS) are "not adequate to prevent fraud and abuse or assure compliance with the requirements of the Privacy Act of 1974," the report by the audit agency of the Department of Health, Education and Welfare

(Continued on Page 4)

Programmer Productivity Rising Too Slowly: Tanaka

By Nancy French
CW Staff

TORONTO — If the rate of programmer productivity improvement remains at its current 3% per year, by 1985 automated information processing could be the most labor-intensive of all industries with the possible exception of agriculture.

This gloomy prospect was presented in a speech prepared by Dr. Richard I. Tanaka, president of the International Federation for Information Processing (Ifip), as his keynote address for the triennial Ifip Congress 77 which began here today.

In contrast to software costs, the price/performance ratio of hardware has improved by a factor of 100 each decade since 1955 and indications are that this will continue for at least the next decade, Tanaka said.

If these rates do not change, by 1985 90% or more of the costs of data processing will be spent on training and support of the people associated with the equipment rather than on the equipment itself, he warned.

But there will be changes. Developments already on the horizon, which had their beginning with semiconductor technology, will have an important impact on this equation, the international marketing and management consultant indicated.

Microprocessors and standalone systems on one hand and distributed processing systems on the other will affect the software problems now faced.

Microprocessors will be substituted to perform software functions. Portions of large mainframe operating systems could eventually be handled by "subsets of dedicated hardware processors," he said.

Fewer Specialists

As software becomes translated into hardware, the functions available will become standardized to a certain extent, Tanaka forecasted. Some may see this as a limitation, but it will help create "a stabilized set of tools with which to solve problems."

Ultimately this will make computers easier to use and more accessible, both physically and functionally, to users who need not be computer specialists, he said.

This accessibility will expand the use of systms that perform computations at levels previously considered practical only in large installations. The proliferation of small commercial and business systems is one indication of what changes in economics can do, the former California Compter Products, Inc. senior executive said.

A second aspect of accessibility is in distributed processing, using terminals with varying degrees of computer capability interconnected by a communications system. With satellite systems and improvements in other transmissions, communications are becoming relatively independent of distance, he said.

Distributed processing has specific international implications, Tanaka pointed out. There are clear advantages to

(Continued on Page 6)

3033 Delivery Dates Set

ARMONK, N.Y. — While the industry remains in the dark about delivery dates for the IBM 3033, the mainframer has begun enlightening eventual systems recipients.

Specific dates recently went out in a series of letters to customers, according to an IBM spokesman who would only tell *Computerworld* that deliveries will begin in the first quarter of 1978.

Positions in the delivery schedule were determined by taking all orders received during the "first-day order" timeframe and then randomizing and sequencing them in a "fair and equitable fashion, he said.

After the "first day order" period, deliveries were strictly on a first come-first serve basis, he added.

In acknowledging the 3033 orders, IBM required each customer to complete a certification form stating he intends to use the system himself or retain ownership. Prospects were also subject to a preliminary credit check, the spokesman said. These measures were instituted to curb speculative orders.

IBM would not disclose how many letters of intent it had received nor the number of delivery dates it has set.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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For Medicaid System

Board Checking Mass. Bid Award

By Don Leavitt
CW Staff

BOSTON — "We've been had. We'd like to see this procurement thrown out and the whole process reopened," the first witness told a review board convened at the State House here late last month to study how the Commonwealth of Massachusetts selected the winning proposal for its Medicaid claims system.

The proposal submitted by Blue Cross of Massachusetts with a subcontract to Electronic Data Systems, Inc. (EDS) of Dallas was selected, but contracts have not yet been signed. The procurement has been challenged since two members of the selection committee have outside business with EDS [CW, Aug. 1].

D. Reid Weedon, senior vice-president of Arthur D. Little, Inc. (ADL), told the review board he was "stunned" by the situation. His company's bid was rejected as nonresponsive, but the challenges could have been "easily cleared up" if the state had met with ADL — "as we asked it to" — to review the apparent deficiencies before the rejection.

The situation was especially surprising, he said, since just weeks before the rejection the state had asked for more time to consider the bids because the selection board wanted to ask several of the bidders some questions. ADL wasn't listed to face questions, so "we were optimistic," Weedon remarked.

The rejection could cost the state as much as $5 million extra over the course of the three-year contract. That, according to Weedon, is the difference between the ADL bid and the $19.5 million proposal from Blue Cross.

Cobol vs. BAL

The three-man review board was organized to determine if the rejections of proposals from ADL and from Citibank were unjustified and discriminatory. Made up of one person from the state's Department of Human Services and two members of the Governor's Advisory Committee on Computers and Data Processing, the board is also supposed to resolve "the Cobol issue."

Most of the bidders said they would write their programs in ANS Cobol since that is specified in the request for proposal (RFP). Blue Cross indicated, however, it will work in BAL with the understanding that it would convert the programs to Cobol whenever they have to be turned over to the state.

Weedon agreed that compliance with the call for Cobol is a "must." He assured Charles Zraket, a vice-president of Mitre Corp. and member of the review board, that ADL would do all of its programming on this project in Cobol.

The reasons the state gave for rejecting the ADL proposal were "technical trivialities," he told Human Services assistant secretary Charles C. Stover, another member of the board. Each bidder was required, for example, to accept the general terms and conditions of the RFP. But whenever ADL attempted to detail its assumptions or to stipulate its intentions to comply — as the RFP provided — the proposal was deemed to be nonresponsive, he said.

ADL failed to include in the technical portion of its proposal a statement accepting the penalty clause condition in the event of missed deadlines. But, Weedon noted, that statement was in the cost portion of the proposal —which the state never opened.

That's where the RFP said the statement should be, he said.

ADL was also faulted for failing to list references. This, Weedon admitted, might almost be a legitimate complaint, but not quite. Ninety percent of the work done by the ADL subsidiary that would handle Medicaid has been with the state.

The RFP itself included a discussion of the welfare program the company has been running for Massachusetts and several members of the selection committee were people with whom the company worked on the project. It therefore seemed superfluous to list that effort, Weedon said.

Following Weedon, Citibank vice-president Alan Newman told the review board he had basically the same reaction to the outright rejection of his company's proposal without benefit of the "normal" oral presentation to clear up possible misunderstandings.

Tenn. Asks End to Tax Suit

NASHVILLE, Tenn. — The State of Tennessee has filed a motion to dismiss the suit that seeks a declaratory judgment on the state's right to tax software filed by Robert M. Sherin [CW, June 27].

The state argued the court lacks jurisdiction over the subject matter of the complaint, which fails to specify a claim upon which relief can be granted.

Tennessee also indicated the plaintiff, Sherin, should pay taxes and then sue for a refund, rather than file a complaint prior to the commencement of the tax.

In his reply to the court, Sherin stressed his suit seeks to enforce constitutional provisions providing for the supremacy of judicial decisions. He refuted many of the state's arguments.

Sherin, president of Nova Computing Services, Inc. of Florida, filed his suit after the legislature voted for a tax on software, although the Tennessee Supreme Court ruled software is intangible and nontaxable under that state's law in the case of Commerce Union Bank vs. George M. Tidwell [CW, Aug. 30].

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Withington Admits IBM Ties at Antitrust Trial

By Catherine Arnst
CW Staff

NEW YORK — A government witness who fought a subpoena to testify in the U.S. vs. IBM antitrust trial because of the hardship he said it would cause him may have had other reasons for being reluctant to testify against the industry giant.

Frederick K. Withington, an expert on the computer industry from Arthur D. Little, Inc. (ADL), recently testified he is currently awaiting publication of a book he wrote as part of an IBM-sponsored program.

Further, Withington said he owns 78 shares of stock in IBM valued at approximately $17,000. He obtained his first shares in 1967, but purchased 40 more in August 1976. He appealed his subpoena in March of 1976.

Nevertheless, although Withington was reluctant to take the stand, he has not been reluctant to talk once there.

Environment for Systems Programming; is scheduled for publication by Addison-Wesley, Inc. in January 1978, Withington told the court.

The proposal for the book, conceived in its present form in 1974, was presented to a board of IBM personnel for approval and accepted at that time.

Withington was to have received $12,000 indirectly from IBM, paid through the publisher. Of this sum, $4,000 was an outright grant paid when the proposal was accepted; the balance was an advance against royalties. Withington has received a total of $7,000 of the funds to date.

Publication of the book and the receipt of the $5,000 balance depend on final approval of the completed manuscript by the same IBM board. This has not yet been given.

ADL Balks at Subpoena

After producing approximately 90,000 pages of documents to IBM, ADL attorneys filed a motion with the court to quash an IBM subpoena for further production. Judge David N. Edelstein, the sole arbiter in the case, agreed to delay his decision on that motion until Withington has finished his testimony.

Meanwhile, Withington's testimony as an industry expert has closely paralleled that of Dr. Alan K. McAdams, the government's chief economic adviser for this trial [CW, July 11, 18]. Withington writes an annual report for ADL subscribers on the state of the computer industry and a five-year forecast, and much of his testimony was based on knowledge he gained while writing these reports.

IBM Share 68.4%

From the reports, he drew a chart showing IBM started out with 71% of the general-purpose computer systems market in January 1961 and has 68.4% of that market now. The value of the installed base of general-purpose systems in the U.S. has risen from $1.8 billion in 1961 to $46.5 billion in 1977.

As of January 1977, IBM's next largest competitors were Univac, Honeywell Information Systems, Inc. and Burroughs Corp., each with 7.1% of the market.

The percentages held by Univac and HIS have dropped consistently from 8.9% and 9.1% respectively in 1973, Burroughs, on the other hand, has increased its market share since then by two percentage points.

The only other competitors IBM had in the general-purpose systems market as of January 1977 were Control Data Corp. (3.6%), NCR Corp.(2.6%) and Digital Equipment Corp.(4.1%), according to Withington. Six others have left the market since 1961, he added.

Two Accused Of Passing Tapes To Eastern Bloc

MIAMI — Two men arrested here in conjunction with an alleged plot to transport components of a cruise missile to Soviet agents are also suspected of passing magnetic tapes and microfiche to Eastern Block operatives.

Carl John Heiser, III and Carl Lutz Weischenberg were recently arrested on the technical charge of failing to register as agents of a foreign government and are awaiting trial scheduled for Sept. 26 in Federal District Court here.

The Soviets allegedly were in the market for components of the cruise missile, uranium and 40 aircraft gyroscopes made by Litton Industries, according to an affidavit by FBI special agent Bill J. Windland.

Weischenberg, a West German citizen, is reportedly slated to stand trial in West Germany on charges of high treason for allegedly supplying Soviet Bloc nations with material from West German DP firms.

Heiser, an American, indicated he had grossed between $150,000 and $200,000 in the last year and a half from delivering microfiche orders for IBM, Memorex and Bendix programs or for equipment such as "Bendix computer drive shafts," according to the affidavit.

Some of the materials delivered were IBM tapes for whose delivery an informant received $7,000, but which cost about $497.75 when purchased from IBM, according to the affidavit.

The affidavit did not mention the contents of any of the media and no information was available from the FBI or IBM.

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Computer Power, Inc., Jacksonville, Florida, provides complete data processing services for a number of banks, mortgage bankers and saving and loans whose mortgage portfolios have over 1,250,000 mortgage loans valued at over 24 billion dollars.

Over 8,400 program modules are now used to provide client services — modules which require storage space equivalent to 2.7 million card images.

Until The LIBRARIAN was installed, program storage and management was an expensive and time consuming problem

According to Technical Support Manager Roy Flieger, "Before we installed The LIBRARIAN, we stored everything on 17 IBM model 2314 disk packs. That meant we had 17 different source statement libraries. We were making 1000 pack changes a month and we were spending over 50 hours of computer time each month reorganizing files."

"Program standardization was a problem too. Programmers would make changes to one pack and not duplicate the changes on the other packs."

The LIBRARIAN enabled Computer Power, Inc., to cut disk storage by 94%.

After The LIBRARIAN was installed 2 years ago the entire source statement library was immediately compressed with the result that Computer Power, Inc., using the IBM 3330 disk system, now stores all of its 8400 program modules on a single disk, constantly on-line. The benefits were far greater than just the savings in disk use, however. Time required for file reallocation was virtually eliminated. Elimination of disk shutdowns and disk changes added another 50 hours a month of usable computer time. And standardization rapidly improved because common program changes no longer had to be duplicated on many different disks.

"We really have file backup now. And that's tremendous."

Roy Fileger remembers, "When we had 17 packs our backup and savings procedures were extremely time consuming. Now, with The LIBRARIAN and only one disk pack, we are able to save everything every single day in just 20 minutes."

ADR's MetaCOBOL is doing more than just conversion.

Computer Power, Inc., is in the final phases of conversion of more than 6000 program modules from DOS to OS/ANS. According to Roy Fileger, "We're running through MetaCOBOL and coming out with state-of-the-art programs, OS/ANS, single entry, single exit with I/O completely changed. All the programs we have converted so far have executed perfectly the first time."

Programs are being standardized as they go through MetaCOBOL.

"Everything coming out is looking alike. MetaCOBOL is picking up errors in violation of COBOL specifications that the compilers would let go through. As a result, our programs are really coming out clean," he continued.

"As far as I know, there is no alternative to MetaCOBOL."

"Any other system would have required handmade changes involving a staggering amount of time," Roy Fileger added.

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Audit Finds SSA Net Open to Privacy Abuses

(Continued from Page 1)

(HEW) said.

But HEW officials are not aware that SSADARS has been misused, according to Edward W. Stepnick, assistant inspector general for auditing at HEW. In a letter to SSA Commissioner James B. Cardwell, Stepnick said the audit had not attempted to find instances of fraud and abuse, but rather to determine whether the potential for misuse of the SSA system existed.

The importance of security within the system and in the use of its terminals "cannot be overemphasized," the report stressed. Containing records on more than 27 million Americans who receive Social Security and Supplemental Security Income payments, the system employs a network of approximately 2,200 terminals across the country.

The terminals provide a user with the communications link required to transmit data on the beneficiaries of various SSA programs to the agency's headquarters in Baltimore. "The data processed through SSADARS is used to add, delete or change information on the computerized records of any SSA program," the HEW audit report noted.

Released by Representatives John E. Moss (D-Calif.) and Charles Rose (D-N.C.), who have also asked the General Accounting Office (GAO) to look into SSA's computer operations, the audit said the weaknesses found in the system's security procedures and controls "adversely affected SSA's capability to protect the integrity of its systems and prevent a compromise of personal data retained in program records."

Abdication of Security

Among the problems identified by the audit was the abdication of management and security of the SSADARS terminals to each individual SSA central office component. Limited central guidance resulted in insufficient emphasis on terminal security, the HEW study indicated.

Security procedures regarding the terminals varied in detail in different parts of SSA's organization, and the security program was managed by only a few employees located at the lower levels of the agency's organization structure, the report said. Further, these employees were assigned responsibility for security as an addition to their usual workload.

As a result of the lack of management, terminals were located in unsecured and uncontrolled areas and were left unlocked overnight, the report noted. The HEW audit agency visisted 69 of the 72 keystations attached to the 35 SSADARS terminals at SSA's main headquarters in Baltimore and found 33 keystations — almost 50% — were in areas that couldn't be secured during off-hours.

Passwords needed to unlock the terminals were known by an excessive number of employees, the report said. Further, the system was designed in such a way that when an employee unlocked one keystation to a terminal, he unlocked them all.

Reports kept to help management monitor the locking and unlocking of terminals were untimely and inaccurate, making them ineffective as flags to possible system security violations, HEW also found.

Finally, programming logic — designed as internal system security to limit the types of transactions which could be processed by each terminal — was ineffective, the report charged. Use of an alternate mode procedure provided a terminal operator with the ability to process claim or transaction data not authorized by his terminal's assigned identification code, but permitted under another terminal's code.

Although SSA recognized the importance of security controls and was devoting increasing effort to security improvements when HEW conducted its audit in July and August of 1976, more needed to be done, Stepnick said in his letter accompanying the report to Cardwell.

Specifically, improvements were needed in management guidance and emphasis on systems security, security over terminal access and use and effectiveness of programmed security clearance systems, he stated.

Stepnick pointed out that "prompt action" was taken by Cardwell's staff to identify an internal systems control deficiency. Subsequent HEW tests showed corrective action was effective in preventing unnecessary and indiscriminate use of the identification number of one terminal for that of another in addressing the system, Stepnick noted.

In addition, as a result of the HEW audit, the SSA last August established a systems security staff in the Office of Operations Systems and Coordination, the report said.

Mitre Study Provides Wiretapping Lesson

(Continued from Page 1)

known report on wiretapping" written by Mitre Corp. for the White House Office of Telecommunications Policy (OTP), according to the congressman.

An OTP spokesman stated, however, that the document obtained by Moss is not the third volume of the study, but "working papers" given to OTP by Mitre. All the information contained in the "third volume" is "commonly available information," he said.

OTP thought it best to lock up the "working papers" to prevent their aiding a potential wiretapper who would have in one document all the information needed to intercept communications, he said.

The report gives step-by-step directions for the would-be tapper, including how to rent property through which lines to be tapped pass, how to dig up cables and how to attach a gas pressurization bypass to avoid detection.

It also enumerates items that might be used for monitoring, such as head phones, modems, a microprocessor, standard oscilloscopes, tape recorder and printers.

The study was originally undertaken as part of OTP's review of the current federal wiretap laws, according to the spokesman. The agency wanted to understand the flaws and strengths of current communications facilities in order to make recommendations on how to strengthen those laws, he said.

Never intended for wide distribution the study is now being edited and reprinted along with the wiretap laws for release to the public as a result of the publicity the report has received, the spokesman noted.

Awarded to Mitre, possibly on a sole-source basis, on June 15, 1976 for $47,034, the contract for the report resulted in a two-volume document called "Study of Vulnerability of Electronic Communication Systems to Electronic Interception." Those volumes are dated January 1977.

Also dated the first month of this year, the document Moss has is entitled "Selected Examples of Possible Approaches to Electronic Communications Interception Operations" and "deals solely with surreptitious methods of wiretapping," the congressman said in a letter to the Comptroller General of the General Accounting Office (GAO) that asked for an investigation into the study's purpose.

Referring to the third volume, or working papers, of the study, Moss wrote, "Nowhere in this unique document is there any mention of legality, court orders or similar cloaks of authority under which such privacy invasions are grudgingly and occasionally sanctioned.

"In effect, then, this publication, ordered and paid for by federal funds, appears to be a how-to-do-it manual on non court-ordered wiretapping," the congressman concluded.

Moss asked the GAO to determine why such a "how-to" book was ordered by the Ford Administration and why it was needed. In addition, he wondered whether its publication could lead to significant privacy invasions in violation of existing U.S. law.

Further, the congressman wanted to know whether the manual's creation was consistent with congressional appropriations to OTP and whether the third volume was deliberately withheld from distribution and from GAO auditors when they conducted a previous investigation into related issues.

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WANG

HEW Accuses Manager

(Continued from Page 1)

claimed some of the more than 200 meals in question on his expense account.

The award of the contract for the student loan management system to On-Line Systems — an award made on June 27, 1975 for an initial $1 million that has since increased by $6.5 million — is under investigation by the U.S. Attorney's Office here as well as by the HEW Inspector General, an HEW spokesman said last week.

"The basis for the investigation is gratuities or irregularities concerning the award of the contract," Robert Wilson, a member of the HEW Inspector General's staff, stated. He noted that the investigation is not confined to Parker and that the computer project manager has a right to rebut HEW's charges at a formal hearing.

Parker must challenge the accusation by the beginning of September or lose his job, according to the letter he received from John Ellis, Executive Deputy U.S. Commissioner of Education. Parker, who had no comment on the matter, was reassigned to another post in HEW last May when investigators initially raised questions about the favors he allegedly received, the spokesman said.

HEW officials would say no more about the investigation at this point except that On-Line's performance of the contract is not the real issue.

The *Washington Post* reported that HEW sources indicated the meals in question were purchased by Gilmore S. (Bim) Wheeler, president of an On-Line subsidiary — Business, Industry and Management, Inc.

Neither Wheeler nor On-Line Systems officials were available for comment by press time last week.

'Washed-Out' User Up Again in Two Weeks

By Ann Dooley
CW Staff

JOHNSTOWN, Pa. — Two weeks after its IBM System 3/15D was destroyed and its data modules were soaked by the waters that flooded this town, Crown American Corp. is "up and running."

The real estate company just completed the first payroll on new equipment IBM sent after the old System 3 was destroyed, DP Manager Mike Shutacka said.

"We haven't lost one record, as far as we know," Shutacka said.

Within a few days after the flood, and before the new system was installed, data was being processed on a System 3 owned by Kimball Engineering, Inc. in nearby Evansburg.

"We've had an informal reciprocal agreement with Kimball and were able to work on the night shift," Shutacka said. "We worked on the vendor listings to keep processing the payables.

"Now, we're located in rented space from IBM," he said, "and it's on a hill."

The work will continue there until the company relocates to larger headquarters, something it was planning to do anyway, he said.

Besides damage to the CPU, the worst loss was the accounting records, which were wiped out, he said. But that is pretty much a matter of rerunning whatever it takes in printout time.

"Also, we lost the paperwork, the invoices and things that were in progress at the time of the flood," he said. Those kinds of things will undoubtedly be sent in again, he added.

"We have a daily and weekly backup system and the weekly is kept off-site," he explained. Right now, "we're considering using an off-site daily backup too.

"We're two weeks behind in processing the normal work and it will take another two weeks to catch up, so it will be about a month before operations are running on schedule again," the DP manager predicted.

Shutacka explained that the computer was located in the basement because the Johnstown area was thought to be flood-free. There hadn't been a flood since the '30s, he pointed out.

At one time the equipment was located on the second floor, but was moved to the basement for space reasons, he said.

When the company relocates "we definitely won't be in the basement anymore," Shutacka said. There's still six inches of mud covering the computer, he added.

Although the damage is still being assessed, Shutacka said the cost to the company for the CPU was over $300,000 and estimated an additional $20,000 to $30,000 loss in other equipment and supplies.

Shutacka, who was vacationing in Florida when the flood occurred, returned immediately and began working with the IBM emergency team set up to help in recovery operations.

IBM is "doing an excellent job," Shutacka said. "It's bent over backward to help us out."

The Crown American system handles complete accounting operations for the real estate company and for two Sheraton hotels and two Holiday Inn hotels which the company owns and operates.

Clean-up operations are still under way in Johnstown. "It will be years before the area recovers," Shutacka said. "Entire roads are washed away and the dust is so thick some people wear masks.

"It's hard to believe unless you see it," he added.

Response Strong For Revamp Tips

WASHINGTON, D.C. — A "significant number" of suggestions on how to revamp the procurement and management of DP facilities within the federal government have been received by the Office of Management and Budget (OMB).

Now the office is seeking the names of people who are willing and able to evaluate the ideas and develop whatever recommendations seem appropriate, a spokesman said.

The comments have come largely in response to appeals in a widely circulated letter from Wayne Granquist, associate director of the President's Reorganization Project within OBM [CW, July 11], and in the *Federal Register*.

As soon as they can be categorized, the ideas are being forwarded to project personnel who are drafting "scope-of-work" assignments for task forces to be organized, hopefully, in the late summer or early fall, the spokesman said.

Implementation of the initial recommendations from the task forces should begin within the year.

Contrary to reports published earlier, personnel for the task forces will be drawn largely from outside OMB. The spokesman said the office wants "as diverse a group of individuals" as it can get from government, industry and the academic environment.

Although the "deadline" for suggestions has passed, the spokesman emphasized that ideas are "always welcome. And so are the names of people to serve on the task forces."

Comments and names should be addressed to Kenneth B. Allen, Information Systems Division, OMB, Washington, D.C. 20503.

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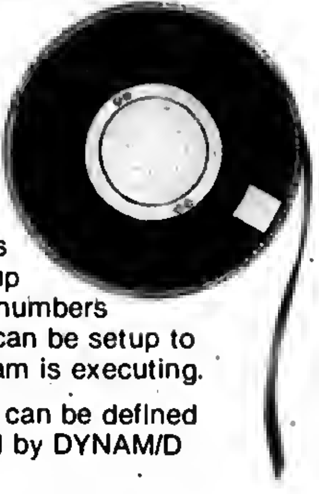

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Itel AS Users Find IBM Software Transparent

(Continued from Page 1)

The CPU was the only thing the university replaced. Running under OS/-MVT Release 21.8, the system uses mostly IBM peripherals.

Maple plans to change to an IBM VS/2 operating system soon, but expects no problems; the installation is already operating VS/2 successfully, but not yet for production.

Throughput Up 50%

Scientific Computers, Inc., of Minnetonka, Mich., has had its A/4s for about two weeks and is getting 40% to 50% greater throughput than it did with its IBM 370/145, according to Richard Walter, president.

The company replaced the first of its two 145s with the AS/4. A second AS/4 is scheduled to be installed within the next few weeks.

When the processors were swapped, no changes had to be made to the DOS operating system, Walter said. The switch took about five hours, although the Itel processor was on-site before that and field service people were running diagnostics on it.

The company, with an on-line system serving about 190 terminals installed at customer sites, runs a service bureau operation.

The throughput improvement it is experiencing with the Itel machine is based on switching from a 512Kbyte 145 to a 1M-byte AS/4 "without doing anything to use the other half meg of storage," Walter said. The throughput is "pretty much what the [AS/4] looked like on paper," he added.

Cost comparisons between the IBM and Itel system are difficult to make because the Model 145 was a purchased machine while the Itel system is leased, he noted.

Faced with upgrading its 145s, Scientific Computers made a study and found the "best bang for the buck" was with the AS/4 because it is a faster machine, he said. It sold both of its 145s to make room for the AS/4s.

Information Sciences, Inc. (ISI) of Providence, R.I. brought its AS/4 up in about a day and a half with few problems, according to William Renfrew, senior vice-president.

Job accounting shows the AS/4 is 2.5 to 2.8 times faster in CPU cycles than the 370/145 it replaced, Renfrew said.

"Everything we're running runs exactly the same on the AS/4 as it did on the 145," he said. There were no changes of any type to any program and the DOS operating system is definitely transparent to the Itel system, he explained.

ISI also runs a second 145 it acquired under a long-term lease from IBM. This system has been running for about three and a half years, but a comparison of the IBM cost then with the Itel cost now shows a savings of several hundred thousand dollars, Renfrew said.

The company is now running under DOS/VS and an upgrade to VM/370 is planned. So far there have been no software problems with the Itel system and the operating system upgrade will proceed as originally planned, he said.

ISI is a DP service bureau for Industrial National Corp.

'Without a Ripple'

Ken Pollock, technical director at the Cooperative Computer Center that serves as a regional computing installation for three Illinois state schools running six remote job entry systems from four different vendors, had a similar story to tell.

The center's 2-byte AS/4 was installed only a week ago. Pollock said the conversion went "without a ripple."

The system was rolled in on a truck Sunday morning to replace the center's 1M-byte IBM 370/145.

Tuesday afternoon the operating system was loaded for 12 hours of benchmarking, and at midnight "we were satisfied."

At that time "we cabled across our disks to excercise our software and after one and a half hours we started production and have been running continually since," Pollock said.

Here, too the CPU was the only element of the system to be replaced.

The AS/4 runs IBM's VS/1 Release 6 operating system.

Pollock, who actually works for Systems and Computer Technology Corp., a facilities management firm that operates the center for the state, said going to Itel involved a certain element of risk. But after seeing the benchmarks, it was a simple decision to make, he said.

DP manager Clarence Millfap, who switched from IBM to Itel in 1969, has great faith in the firm as a result of their eight-year relationship; when it began marketing the AS line, he was confident the system would be a good one, he said.

Millfap's firm, Equitable Life Insurance Co. in Des Moines, Iowa, took delivery on a 1M-byte AS/4 on June 20 and was into production with it by June 24.

Equitable's conversion was somewhat different than the usual since "the 4" was brought in — instead of a 370/148 — to replace a three-channel IBM 360/50 with 512K main memory.

But "the cross-over was so smooth it scares you a little bit," he said.

Millfap is very happy with the AS/4's performance — even under IBM's archaic DOS Release 27.1. CPU processing time is twice as fast as the Company's previous 360/50, he said and jobs that used to take four hours now take about two.

"That's not to say that a job can't get bogged down in printing," he added.

By October or November, the insurance company plans to convert to DOS/VS Release 33. Millfap expects that conversion to take only about 28 hours.

Proposal Book Scores Again!

The spectacular rise in sales of *How to Create a Winning Proposal* has scored another net gain this quarter for Mercury Communications, Inc. shareholders. A timely and innovative "how to," *Winning Proposal* has racked-up a stunning track-record since its publication early last year—with the largest volume of sales coming from the aerospace/defense and computer/EDP industries.

Written by two highly-qualified proposal consultants, the book is rapidly becoming the standard text for use in government, commercial, OEM and service company proposal efforts. It is currently being used in GSA, NASA, DOD, HEW, ERDA and other government/military agencies as an aid in proposal evaluation.

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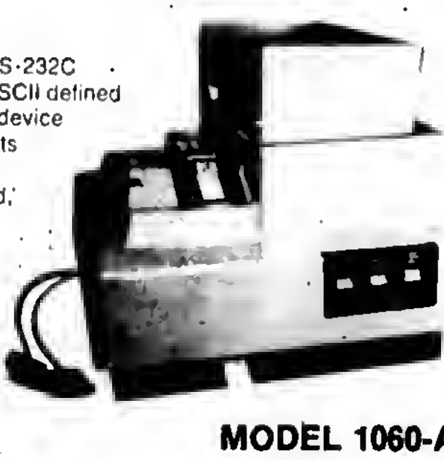
A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's and IFB's are also included.

Copies are available pre-paid only from Mercury Communications, Inc. 730-CW Mission, Santa Cruz, CA 95060. $55 includes 3-5 day delivery inside USA. In Calif. add $3.12 tax.



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Programmer Gains Too Low

(Continued from Page 1)

the possibility of transferring information across the network because this also transfers technological skills.

If the transference occurs across national boundaries, one can envision the emergence of an information segment in all national economies, even in the small ones, he said.

The potentially positive effect of information transfer on economic progress is widely recognized, Tanaka noted, but problems also come with it — problems relating to safeguarding the ethical and legal interests of individuals and organizations while storing and transmitting information.

"Personal as well as nonpersonal information is already flowing across many international boundaries with few controls or restraints and little accountability," he noted.

And while many businesses and services have improved as a result of this information exchange, these activities are not yet covered by any international law, convention or agreement.

Many nations have begun to enact privacy legislation, but each takes differing forms and levels of definition. "The effect of piecemeal legislation, even when implemented in a completely open spirit of cooperation, is to restrict the flow of data to the lowest level," Tanaka said.

Those areas with strong safeguards will be unable or unwilling to transmit information to areas with less data protection, he added.

"In competitive situations, the rules for handling data may be used as excuses for lack of cooperation. Consequently, even as safeguards are being defined and implemented, hopefully on a uniform international basis, there must be assurance that data flow and international commerce will not be unduly inhibited," he said.

Developing Nations

One cannot discuss the transfer of information or technology without mentioning the developing countries, Tanaka said.

While many people believe computers are essential to the development of a country, it is difficult to know how valid that premise may be.

"Not only is it not evident that computers can assist, they may in fact represent a diversion and a waste of economic resources unless they are realistically and carefully used," he cautioned.

Also Plan DP Ethics Code Inquiry

House Republicans Revive Privacy Task Force

By Nancy French
CW Staff

WASHINGTON, D.C. — Republican members of the House of Representatives have resurrected their task force on privacy to study some of the issues left untouched by the Privacy Protection Study Commission.

Under the leadership of Barry Goldwater Jr. (R-Calif.), the task force will hold hearings and study the problems posed by electronic mail, electronic funds transfer, wire tapping, mail covers and Interpol.

The task force will also reopen its inquiry into whether DP professionals should adhere to a code of ethics and standards of conduct such as those observed in the accounting community.

Before the task force was disbanded in 1974, it recommended that DPers do need such a code, a spokesman indicated.

Along with accountants, DPers share responsibility for the business activities of a company and, in some ways, have greater control, he noted, for it is they who control the impact and use of technology.

Another area the task force will be concerned with is Congress itself.

Congress, which includes the Library of Congress, the Government Printing Office, the Copyright Office, the Office of Technology Assessment, the Budget Office and several others besides the House and Senate, is an enormous organization, the spokesman pointed out. The Library of Congress alone, excluding the Congressional Research Service, employs 5,000 people.

A number of apparent privacy violations reported by congressional employees to Republican members of the House have raised their concern about congressional record-handling practices.

For example, a number of library employees complained they have been required to sign annual performance evaluations that were blank; once signed, these documents were kept from them.

The task force will attempt to prepare a description of the existing practices, including the philosophical arguments for and against any specific procedures. In addition, it will examine the risks of privacy legislation for the private sector that will hit upon costs, as well as the possible outcome of increased bureaucratic regulation that may result.

Task force members include Charles Whalen (Ohio), Robert Lagomarsino (Calif.), Micky Edwards (Okla.), Philip Crane (Ill.), Margaret Heckler (Mass.), John Rousselot (Calif.), Jack Kemp (N.Y.), Dan Quayle (Ind.), Frank Horton (N.Y.) and John Cunningham (Wash.).

Swedes Decry Lack of Privacy, Blame It on DP

STOCKHOLM, Sweden — Next to unemployment and inflation, the protection of privacy is one of the most vital issues facing the community, according to a public opinion survey conducted by the National Central Bureau of Statistics here.

Nearly one-third of some 1,000 persons interviewed declared there is less privacy today than five years ago, and one in three of this segment blamed this on computers, data registers and the like.

Fifty-four percent of the total believe the situation is largely unchanged, while 6% detected an improvement. The better educated were more pessimistic than the rest, the bureau said.

About 10% of those surveyed claimed to have experienced some form of intrusion into their private lives over the past five years, a third of them linking the occurrence with advertising or marketing activities. One in five cited public opinion surveys or the actions of the authorities.

Four out of five of those interviewed think computers allow the authorities to give better service to the community, while two-thirds wholly or partly hold the view that more data is accumulated in computers than is really necessary.

Forms Due For CCP Exam

CHICAGO — Registration forms for the Certificate of Computer Programming (CCP) exam must be in by Aug. 31, according to the Institute for Certification of Computer Professionals (ICCP), sponsor of the exams.

On Oct. 22, the test date, three different examinations will be offered — oriented toward business, scientific and systems programming.

The top 50% of the senior-level programmers practicing today should be able to pass the exams, according to the ICCP.

The fee is $75. Study guides and other details about the CCP as well as the Certificate in Data Processing examinations can be obtained from the ICCP's office at 304 E. 45th St., New York, N.Y. 10017.

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DP Helps States, Utilities Monitor Air Quality

By John P. Hebert
CW Staff

SAN DIEGO, Calif. — Data communications and computer technologies have been instrumental in helping some state power companies and environmental protection agencies (EPAs) monitor the air quality in their cities and towns.

And for the power companies the application of DP is helping avoid fines of $10,000/day by making sure the companies don't introduce more than a specified amount of pollutants into the air at any given time.

Stagnant air is the power companies' worst enemy. When winds die power companies must use low-sulfur fuels, which cost $1.25/barrel more than those high in sulfur that can be used in clear weather.

Because a utility can burn 10,000 barrels of fuel each day to generate electricity, it is advantageous to shift from one fuel to the other, depending on the weather.

The power companies have either procured their own computer and communications systems or hired DP. experts from consulting firms as a matter of self-protection, according to Al Budd, marketing vice-president at Monitor Labs, Inc. here.

In fact, because federal and state legislation is in favor of the consumer, in this regard, air pollution monitoring and data gathering has become a $100 million annual business, according to Budd, whose company developed and sells an on-line air quality data monitoring (Adam) system to utilities and state EPAs alike.

Station Configuration

The Adam system's central station consists of a Data General Corp. Nova minicomputer with from 16K to 32K of main memory, a Teletype Corp. ASR 33 teletypewriter, an 800 bit/in. DG or Kennedy Co. magnetic tape transport and a Centronics Data Computer Corp. 101H line printer, Budd said.

It also includes a Remex Corp. Model 6375 paper-tape punch and a "low-cost" CRT such as a Beehive Medical Electronics Corp. or Lear Siegler, Inc. console, he added.

Telephone lines are also a necessity for Adam, as are modems to interface the ML-7000 central station with data loggers and up to 20 remote air-monitoring stations, each with a dozen or more chemical and weather sensors in the field, Budd said.

The systems are currently being used by EPAs in states including California, Massachusetts, Washington and Wisconsin and by power-generating companies such as Georgia Power, Geomet in Maryland and Gulf Power in Florida.

"The old way of measuring air pollution is no longer acceptable," Budd said.

"Until recently, the various analyzers were placed in a remote shelter and data was recorded on strip chart recorders or magnetic tape.

"Periodically, someone would pick up the tapes. If a sensor or recorder stopped operating, it might be hours before the malfunction was discovered. Also, there was no possibility of on-line control in case of an emergency," Budd said.

Continuous Monitoring

In the Adam on-line telemetry system, all of the data is being monitored and validated continuously. Calibration of each sensor can be initiated from the central station by one person keeping tabs on every sensor in the network and measuring as many as 100 parameters.

If data from a sensor or a remote data logger shows excessive errors, the operator can take immediate corrective action.

Quick correction action is necessary because in order to clean the air the state-controlled EPAs require power companies and refineries to prove that the pollutants being emitted are not adversely affecting the atmosphere.

Adam consists of a network of Monitor Labs data loggers - one at each remote station — connected to the minicomputer through leased or dial-up lines using Vadic VA305 G or VA305C 300 bit/sec modems respectively, and Vadic VA801AC pulse dialers.

Each remote data logger digitizes and formats the data from the sensors at its station before transmitting to the Adam central station, where the necessary conversions are performed on a real-time basis.

"We use Vadic modems in our Adam system because they're cost-effective and reliable. We can buy them cheaper than we can build our own. We've designed them into the system," Budd explained.

"Probably the most important feature is Vadic's local and remote loopback capability. We have implemented these test features into our hardware and software so we can quickly check out the complete network," he continued.

"Using our software and Vadic's diagnostics and displays, it's simple to identify a problem and localize it to the phone line, the modem or our hardware," Budd said.

A system check is initiated if the operator at the central site detects excessive errors from a particular remote station.

First the modem at the computer site is tested. Under Adam software control, the modem is put into local test, where the modem transmitter and receiver are set to the same frequency and the transmitter output is connected to the receiver input.

In this mode, data is looped from the computer through the modem and back. This usually consists of typing information on the console keyboard and checking its validity. The test checks out the local modem and data terminal.

If the local modem checks out, a remote (echo) test is made. Under software control, the specified remote station is selected, all other stations on the line are blinded and the remote modem is put into the remote test mode.

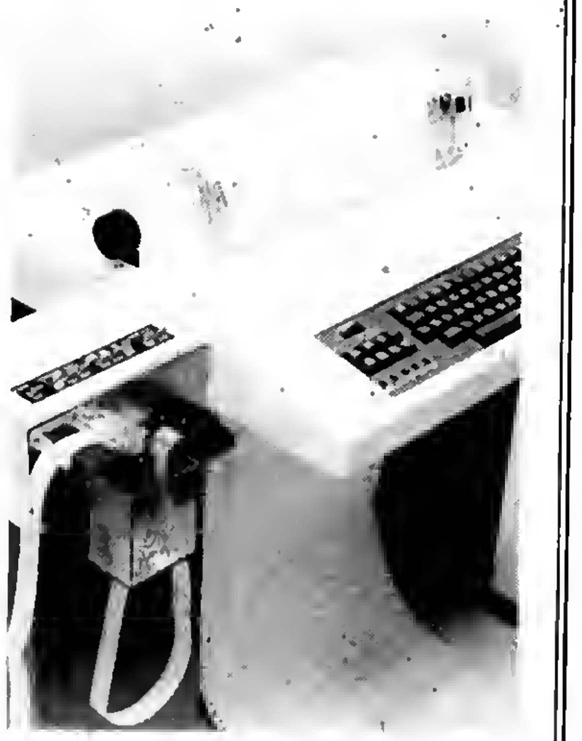
Remote test disconnects the modem from the data logger and connects the modem receiver output to the transmitter input. Data now received by the modem's receiver will be retransmitted to the central computer.

This test verifies both the remote modem and the communications channel. If both the local and remote tests prove valid, the problem is isolated to the remote data logger or one of the sensors. A technician can then be dispatched to the scene for repair or replacement.

The modem's diagnostics can be taken another step in case the local and remote loopback test initiated at the computer site are not conclusive. For example, if the local modem test checks out, but the remote test doesn't, it could be the telephone line or the modem at the data logger.

When this type of ambiguity exists, a technician is dispatched to the remote location and the local and remote tests are done at that end.

If the remote modem is found to be operating using the local test mode and the central computer modem has already been verified, the problem must be in the telephone line. At that point the phone company can be called in.



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DP-Aided Program Funded By State.

Handicapped Kids Learn at Home Via Cable TV

By Molly Upton
CW Staff

AMHERST, N.Y. — Handicapped children unable to attend school on a regular basis are receiving instruction at home on television screens through a program here now being financed by state funds.

Originally a two-year pilot program financed by an $817,000 grant from the Department of Health, Education and Welfare's bureau of education for the handicapped, the project this year will be expanded to tutor about 500 students, according to Jim Morilla, an associate in the state's Department of Education, Bureau of Program Development.

Previously available only to about 100 students in Amherst, the instructional program will be expanded to reach students' homes and some schools in Buffalo, Tonawanda and Kenmore as well, he said.

The same system is being used at the Human Resources School for the physically handicapped in Alberton, Long Island, for physically handicapped on a closed-circuit basis but will soon be available to homes there, too.

The cost of replicating the system is under $200,000, as original development is now completed, he said. Unit costs will decrease even further when new video transmission techniques currently being developed increase by ninefold the number of students who can use a given channel on the cable TV system, he added.

In the pilot project, the $150 cost of the keyboard/coupler was underwritten by the grant. Morilla's biggest problem is finding the financing so that families don't have to pay for the units. He is attempting to form a consortium to obtain funds or else arrange some sort of charge-back scheme to school districts.

The program provides instruction to children who are physically handicapped, emotionally disturbed and neurologically impaired as well as chronically ill and hospitalized.

Interaction Via Keyboard

A student dials the central computer, places the phone in a special acoustic coupler and interacts with the system via a keyboard attached to the telephone. Requested material is delivered by the International Cable CATV system to the students' TV.

The system is called Tel-Catch (Televised Educational Lessons via Computer-Assisted Instruction at Home over Cablevision to Children wiht Severe Handicapping Conditions).

It was developed by the Mitre Corp. as part of its Time-Shared; Interactive, Computer-Controlled Information Television project (Ticcit).

"Technology has traditionally bypassed the handicapped in the educational field primarily because of the low frequency of handicapping conditions and the high unit production costs," according to Marillo.

"But Tel-Catch, by aggregating enough students to make unit costs lower, is proving that technology is a feasible solution to the special educational problems of the handicapped," he observed.

At the heart of the system is a Hewlett-Packard Co. 2000F system which has access to three major files of curriculum materials. The first contains eight separate courses ranging from third grade to high school equivalency level.

A second set offers about 350 lessons on a wide range of subjects for grades one through nine, and the third includes a set of simulations and games available in the HP-contributed program library.

Many of the programs were developed by educational researchers at Stanford University and the Palo Alto, Calif. Unified School Disrict.

The 2000F, which is linked to an HP 2100S with 64K bytes and an HP 2100A with 16K bytes, as well as HP disk and tape units, retains a scholastic file on each student and tailors an academic menu to his speciific needs, according to Tel-Catch developers.

Teacher's Function

After the student indicates what type of course he wants to study, the computer will locate the last question completed by that student. But the system doesn't rely completely on machines.

A student can punch a key on the keyboard asking for personal assistance. Two special education teachers are available to respond to individual requests.

The Tel-Catch project also includes material for the childrens' parents.

Tel-Catch student learns how to access her individual file, maintained on a high-speed minicomputer.

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Mayoral Candidate Attacks DP Voting

GREENSBORO, N.C. — Claiming that adopting computerized voting is the same as encouraging vote fraud, mayoral candidate Marion Porter has accused the Guilford County Board of Commissioners of "selling the integrity" of votes in the county by switching to a computerized system.

The Computer Election Systems (CES) voting system will be used for the first time in Guilford County's election this fall, the one in which Porter will be running for mayor of Greensboro.

Porter claimed elections are difficult to "fraudproof" and computerizing elections make them even more so.

The computer programs are very dangerous, she said. Someone could rig the program to winnow out a certain percent of a candidate's votes and no one would ever notice, she charged.

"All sorts of scary kinds of vote fraud could be used to hit particular candidates," Porter said.

Computer systems are not error proof either, the U.S. Labor Party candidate charged. An error could occur and not be discovered until after the election and perhaps never, she said.

The Labor Party wants a uniform ballot in order to avoid misuse of the system, she said. One way would be to require all voters to sign their names at the polls.

With a computerized system, the only way of assuring honesty is to have a completely independent programmer check each candidate's returns, she stated. However, such a method is impractical and wouldn't even guarantee a fraudproof system, she said.

Program Predicts Recovery Paths Of Open-Heart Surgery Patients

YORKTOWN HEIGHTS, N.Y. — In the critical hours following open-heart surgery, one of the most important questions doctors must face is whether the patient's recovery is likely to be easy or difficult. Survival often depends on an early and reliable answer to this question.

An experimental computer program capable of predicting a patient's recovery pattern — even before surgery — has been jointly developed by scientists at IBM's Thomas J. Watson Research Center here and physicians at the State University of New York at Buffalo and Buffalo General Hospital.

The program is an outgrowth of an earlier effort by the two research groups to develop a computerized procedure for characterizing the types of patient recovery patterns.

While the experimental program has not yet been used during the actual hospitalization of a patient, this goal has a "very high priority" and the earlier recovery-pattern characterization program is already being used on a regular basis, according to Dr. John H. Siegel, chief of surgery at the Buffalo hospital and head of the research team.

Patients Analyzed

In order to use mathematical techniques to predict the recovery path of a patient, IBM researchers analyzed all the data gathered during the recovery periods of 32 patients. They also studied the diagnoses physicians had made at the time the patients were in the hospital. In the end, they had a program that matched the physicians' classifications of the patients' recovery patterns.

Then the computer program was put to the test with data from 54 other patients. The machine was asked to predict a recovery pattern with only one or two days of data.

The computer program predicted the recovery patterns of all the test patients based on data collected immediately after surgery with a reliability of 72%. When the computer was given all the data collected for two days following the operation reliability rose to 88%, researchers found.

Highest-Risk Cases

The program proved to be 65% reliable in predicting the likely recovery patterns of the highest-risk patients with only the data collected just before an operation. Thus, if a patient seems likely to have a very difficult, even fatal recovery period, a decision could be made not to do the operation at all. Or, if the operation is absolutely necessary the operation can be monitored more closely than usual.

The recovery prediction program is based on a set of 11 medical measurements collected from the patient through a catheterization procedure. During the recovery period several sets of the measurements may be collected in order to chart the progress of the patient.

Four of the measurements have to do with heart function, four others tell something about the condition of the blood vessels and body chemistry and the remaining three measurements concern lungs function.

Basic Patterns

Patients recovering from open-heart surgery generally fall into one of three basic patterns.

The Type 1 patient will show a rapid recovery with a minimum need for drugs to support the heart and lung functions.

Type 2 patients, on the other hand, will need heavy drug support, although they can be expected to recover satisfactorily.

Type 3 patients require the most extensive drug support and even then the prospect for recovery is marginal.

Without a computer, physicians can not classify a patient's recovery type before surgery and may take up to three days after surgery to correctly classify all the highest-risk patients.

In addition to improving the recovery outlook from open-heart surgery, Siegel sees the computer program as a possible step toward lowering the cost of medical care by reducing the time spent by the patient in the hospital.

Savings Cited

"If we can reduce the long-term stay of patients both in the intensive-care unit and the hospital itself, the saving there will more than outweigh the cost of doing one of these computer analyses," he said.

In the case of a heart patient who does well, the normal stay in the intensive care unit is two days. A patient experiencing a difficult recovery might spend a week, or longer, in intensive care.

"Of course, if you can save somebody's life, that's an incalculable value," Siegel added.

The program was funded in part by grants from the National Institutes of Health.

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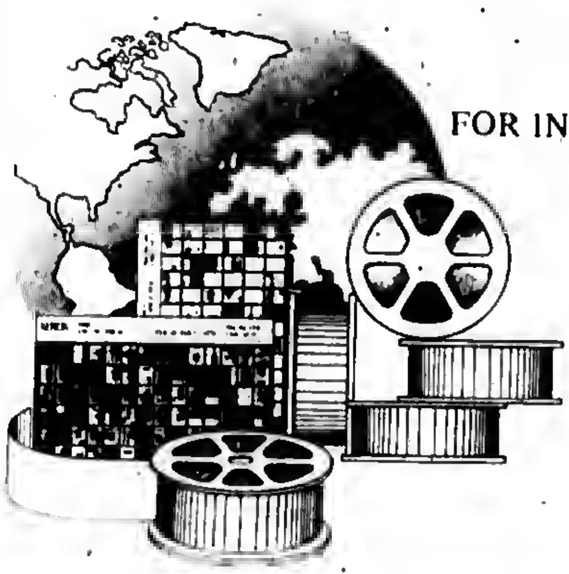

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

To Update Price Changes

Commodity Observers Test Voice Data Entry

By Molly Upton
CW Staff

CHICAGO — A small group of market observers at the Chicago Mercantile Exchange is using voice data entry to update price changes on the commodity exchange here.

Voice data entry and hand-held keypads are two alternatives being considered to replace the 17 space-consuming terminals currently on the trading floor, according to Glenn Windstrup, manager of information services.

Three voice data-entry units from Threshold Technology, Inc. have been on-line on the floor since April as part of a pilot project.

As observers notice price changes, they utter them into their wireless microphones. The data is transmitted to a device based on Threshold's 500 microcomputer which is linked with a Data General Corp. Nova, he said.

The information is then transmitted from the Nova to the exchange's IBM 1130, which prepares the data for the ticker and a display board, Windstrup indicated.

The floor of the commodity exchange is an "open-outcry market," with traders shouting price changes.

The three persons using the voice entry units are assigned to watch those commodity markets with a lower volume of trading, he said.

For the other commodities, observers write the quotes on three-by-five cards which are then relayed to one of the 17 terminals on the floor for input.

It is too soon for a verdict on the system, Windstrup said, adding "we're very much in a test mode and it would be premature to give an evaluation." Threshold provided the software for the system.

As for the wireless hand-held keypad alternative, the exchange is still negotiating for a test system.

And, although the exchange is looking for alternatives, Windstrup said it would be "premature to say the exchange will consider switching, since there's nothing definitive that says the methods are better than the current ones."

Taxpayers' Suit in Trouble

By John P. Hebert
CW Staff

CONCORD, Calif.— Taxpayers contesting the acquisition of an IBM computer system by school district officials here may have lost their bid to have it returned to IBM.

Judge Richard Calhoun handed down a "memorandum of intended decision" last week in the Superior Court of Contra Costa County that disagreed with each point of law on which the taxpayers based their case against the Mt. Diablo Unified School District [CW, April 25].

Although the memorandum is not a final judgment, there is little chance Calhoun will change his tentative ruling, according to Stuart Safine, the taxpayers' lawyer.

Smith vs. Mt. Diablo was initially brought in 1974 and has been bounced back and forth between courts since that time [CW, Nov. 22, 1976].

The present superior court case was brought last January and continued until early last April.

Jerry Smith and the other taxpayer-plaintiffs alleged the IBM 370/125 system had been purchased without open competitive bidding and with funds earmarked for school building construction.

They hoped to recover about $650,000 — the cost of the computer, peripheral equipment and maintenance costs from January 1974, when the system was installed, to the present.

Claiming he had presented "consistent evidence" against the school officials, Safine said Calhoun's tentative decision was "overwhelming" and makes no sense at all.

"We had one helluva good case and it looks like something funny is going on here," Safine said, claiming Calhoun had only two working days in which he could have reviewed and digested information in the three final briefs.

The judge "obviously had his mind made up" before reviewing the briefs, Safine charged.

The taxpayers "will definitely appeal the case when a formal judgment is handed down, after they discover the bases for the judge's conclusions," he said.

Curtis Prize Awarded

EAST LANSING, Mich. — Dr. James L. Lubkin of Michigan State University is the 1977 recipient of the John A. Curtis Award for the outstanding paper presented in the Computers in Education Division at the annual conference of the American Society for Engineering Education (ASEE).

Lubkin is a professor of civil engineering and metallurgy, mechanics and materials science. He received the award for his paper "Teaching Professional Use of the Computer While Teaching the Major."

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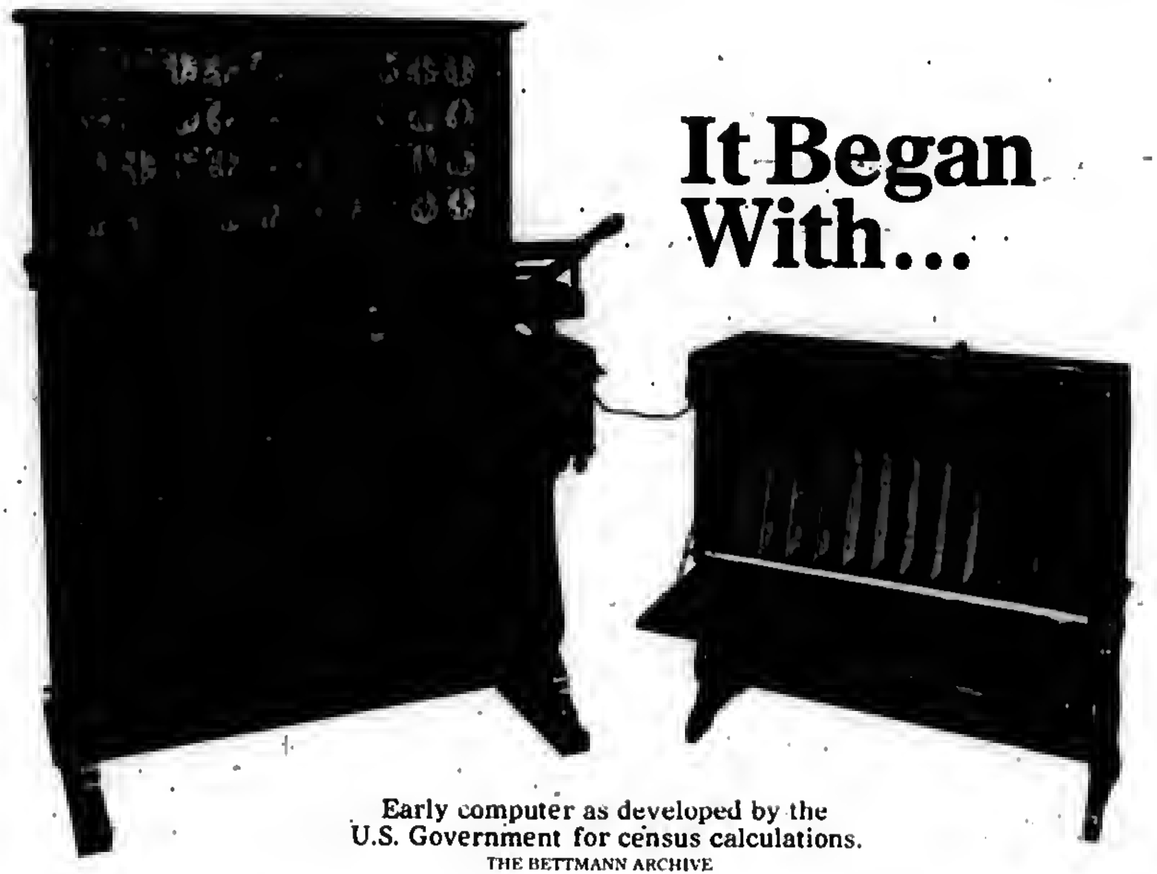

Early computer as developed by the U.S. Government for census calculations.
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Editorial

New Heyday Coming?

Not too many years ago, users were assaulted with a variety of plug-compatible peripherals. Each of these disk and tape systems promised lower prices and sometimes improved operations compared with the IBM peripherals they replaced.

Today a similar competitive area is opening up with the IBM-replacement CPU — the "alternative system." The company generally credited with launching the concept of the alternative system is Amdahl Corp., which began with CPUs that offered improved operating parameters while retaining IBM operating system software.

Since then, Itel Corp. has introduced its Advanced System series and Control Data Corp. has unveiled its Omega system. These alternative systems are being sold as functionally equivalent to the IBM mainframes they replace. In addition, the vendors say, the user gets improved processing power at lower cost.

In the case of Itel and CDC, the user has a choice between using IBM peripherals or using plug-compatible systems supplied by the firms. And varied financing plans are available with many of the alternative systems to optimize the accounting goals of the customer. Itel was a pioneer in this area with its innovative packaged leased plans that originated during the plug-compatible peripheral heydays.

IBM has not been standing still while the alternative systems have emerged. It introduced the 3033 and soon will introduce a similar CPU, reportedly slated to be called the 3032, and perhaps another model with it.

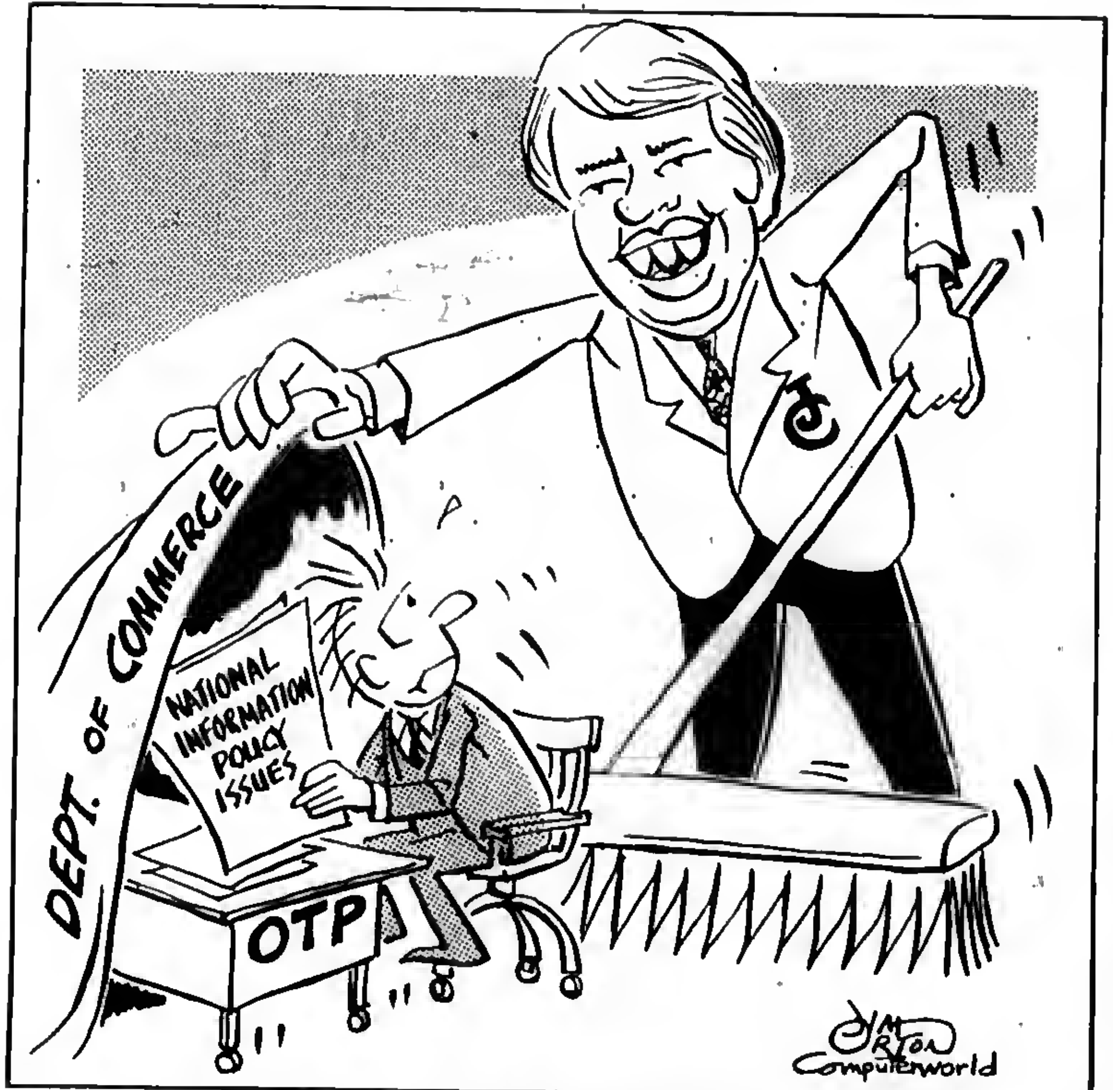
In addition, the industry leader has lowered CPU memory prices and, in some cases, split operating systems between software and microcode modules, thus trying to slow down the alternative system concept.

But early users of the alternative systems are pleased with their operating benefits and the associated financial savings. There is every indication the alternative system area will grow (see series beginning on Page 39).

It is still too early to say whether the alternative systems will become as popular as the plug-compatibles were. There are some differences, especially in size. An alternative CPU or complete system represents a much larger investment for a user than a disk subsystem.

But the competition is growing. IBM is being challenged on its home turf, mainframe for mainframe, with high stakes for the challenges. Users are watching on the sidelines, evaluating and comparing systems to see which best meet their needs.

This is still a dynamic industry, and in its relatively short life one principle has emerged: When alternatives are present, the user benefits. The heyday of the alternative system may be just around the corner.



'What Y'all Need Is a Mite More Sheltered Environment. . .'

Letters to the Editor

IBM 3033 Delivery Schedules Will Stir Marketplace Panic

When IBM announces the delivery schedules on its 3033s, panic will hit the marketplace. IBM plans to produce only 800 systems at 40 systems a month and presently has over 2,100 orders for such systems.

Will IBM expand its manufacturing capabilities to produce more systems? No! Will there be a panic to order Amdahl computers? Yes! What will happen to customers selling their IBM 3033 early deliveries at fantastic premiums? They will never see a machine from IBM.

It is expected that IBM will attempt to calm this panic by announcing the IBM 3032 on or about Sept. 15. These systems will probably reduce the 3033 customers by, at most, 400.

The problem is bewildering. Used computers will be at a premium and it appears the Japanese can take advantage of this situation through massive imports. Don't expect IBM to randomize delivery positions, as it will definitely handfit preferred customers.

George S. McLaughlin Jr.
Summit, N.J.

SSN Misused Once Again?

The July 25 issue of Computer*world* printed an article describing a criminal wanted by the FBI ["Systems Analyst Sought by FBI for Fraud"]. While I feel CW offered a valuable public service in doing so, part of the description irritated me.

Your attempt to track a person down using his Social Security number (SSN) indicated your approval of its use as a general form of identification. I am opposed to this even where it applies to criminals.

Now you know how I feel on the subject of using the SSN as an identifier. Please publish your view.

Steven R. Seltzer
Willow Grove, Pa.

Oops! We goofed. We agree with Seltzer that the SSN should only be used for Social Security purposes. Ed.

Footnote on IBM in Nigeria

I would like to add a footnote to the letter written by Nate A. Newkirk illuminating the generosity of IBM in Ibadan, Nigeria [CW, July 11].

At that time, 1962, IBM had no installation in Nigeria, that market being shared by ICL, NCR & Burroughs. There may indeed have been only the benefit of Nigerian nationals in mind when this computer center and several scholarships were donated, but at that time, as a competitor, I did not so view the IBM action.

I would then have agreed that "15 years later IBM's investment continues to provide benefits in keeping with Watson's and IBM's original intent."

Norman J. Parkinson
North Bend, Wash.

Lord Challenge 'Asinine'

Kenniston Lord Jr.'s "challenge" to Joseph Rigo [CW, July 25] was both asinine and ludicrous.

Asinine, because he feels that merely taking an exam will change somebody's feeling about it. That is sort of like drafting somebody into the armed forces and expecting him to change from a dove into a hawk.

Ludicrous, because he thinks that people and their ideas can be bought, regardless of their founding. They pay draftees, don't they?

Andrew R. Farber
New York, N.Y.

Data Past

Five Years Ago
August 9, 1972

WHITE PLAINS, N.Y. — IBM said its System 370/135s and 145s would be upgraded to include virtual storage capabilities at no charge. At the same time, the company announced the 370/158 and 168.

The firm also announced virtual storage packages for the 370/155 and 165, but those were available only for purchased systems and cost $200,000 for the 155 and $400,000 for the 165.

— — —

WHITE PLAINS, N.Y.— The first of IBM's four system control programs, OS/VS1, was used by the company to demonstrate the capabilities of the expanded line of 370 CPUs. Each of the control programs was compatible with the existing version of DOS or OS to avoid the conversion complications that accompanied switches from one operating system to another in the past.

Eight Years Ago
August 13, 1969

NCR Corp. admitted there were problems with software designed for its Century 100, but said they were being solved. One user said, for example, that the Central Information File, a software package for banks, really required a Century 200.

— — —

NEW YORK — PL/I continued its slow march toward standardization at a meeting of the Composite Languages Development Corp. The group, a division of the U.S. Standards Institute's X-3 Committee on Computers and Information Processing, was formed to further develop the PL/I language in collaboration with Technical Committee 2 of the International Federation for Information Processing and Technical Committee 10 of the European Computer Manufacturers Association.

DPers 'Disconnected' From Family Life?

By Jack Stone
Special to CW

As I continue to report on what, I hope, are new and interesting facets of the connection between humans and computers, I have steadfastly refrained from carrying the discussion to the rather sacrosanct quarter of personal lives.

However, I decided to make an exception for this column after having received a very thoughtful and provocative letter from the wife of a computer person. It is printed below.

This letter captures in a concise and literate way the feelings expressed to me by a number of my friends who are emotionally entangled with computer people — both with and without matrimonial status. The computer people are accused, without regard to gender, of being variously insensitive, withdrawn, callous, hard-hearted, unfeeling, introverted, inhuman, soulless, dull, unsympathetic and apathetic.

Are computer people, as a group, any more or less humanistic than any other group of professional people in America? Surely all of us have heard charges of heartlessness levied at every major professional group during recent years including doctors, lawyers, politicians, engineers, scientists and professors. Are these people properly "connected" to high standards of humanistic conduct?

Do computer people generally develop into successful family partners? I think we have all seen good and bad marriages involving computer professionals. In my own experience, I don't believe the percentages are much different from those of the other professions. I must say, though, the marriages of my highly technical friends seem to be working out better than those of my computer systems marketing friends.

Are computer people generally "insensitive" and "unfeeling" toward other people?

I'm not prepared to say the answer is "yes" or "no," but I can say that computer people are generally preoccupied with their work. I do not conclude that computer persons are insensitive by virtue of their creative abilities, but I do believe that a combination of heavy work loads, exhausting schedules, lack of social opportunities at work and the need for intensive study outside work may tend to give the appearance of insensitivity.

Unfortunately, even the appearance of continuing apathy will force the decay in emotional relationships.

So here's the letter. I suggest you read it first for content and then for style. You may find, as I did, the letter is more of a lyrical poem than a communication to a freelance writer.

The Human Connection

Dear Jack:

One fine day I stumbled upon your column while I was waiting for an interview in a local computer company. "Aha!" I thought. "Can this be true? Is there someone who actually recognizes there just might be an element of dehumanization in this vast, mystical computer world of ours?"

Let met tell you about my "connection" to a computer-type person and the world therein.

I'm the "human." The "connection" was marriage — you know, that state of matrimony designed (programmed) for love, children and happiness. Well it was all of these things, but Oh God, there was loneliness, too — a (computer) world of loneliness.

In the beginning there was love, not a lot of communication, but love, and soon a child, and another — and then THE JOB, a position with a large computer firm. We were moved away from family and friends to an area of computer firm people.

But that was okay then. It was exciting to explore a new place and to discover new friends. It was even a bit comforting to have neighbors who all worked for the same company. You see, we wives would commiserate over our husbands' involvement in their jobs and the apparent indifference they had to their kids, holidays and us.

It was good therapy, that commiserating — for a while. But when I became aware that all of my "special times" — times I wanted to share — were simply "plain ol' times" to him, the loneliness became too large, too sad.

There was a Christmas, for instance, a glowing day of happy children, lovely carols and good friends. I think there was even snow, and I had such nice feelings that I suggested a glass of wine by the fire. He said, "Too late, goodnight." So sad, no quiet time together to share the specialness of the day.

And the trip to San Francisco was another time. We left the kids with a sitter and flew off to this exciting city, stayed in an elegant hotel high on a hill, ate in romantic restaurants, walked along Fisherman's Wharf, through Chinatown, then up and down the streets of that fascinating city.

When we returned home, a friend asked my husband what he thought of San Francisco. He paused a moment — he often paused before he spoke — and I waited . . . (compute . . . Compute . . . COMPUTE . . . PRINTOUT!) — "Nice."

(Continued on Page 16)

IBM Trade Controversy Goes On in Australia

The Taylor Report

By
Alan Taylor
CDP

Firms that trade under initials are sitting ducks for "clever" sayings, and IBM is no exception. Its personnel policies were harpooned some years ago with the suggestion that IBM stood for "I've been moved." The practice of "decommitting" products and descriptions after taking orders was summed up in the phrase "I've been misled." Now, as many people in Canberra, Australia, would tell you, the letters stand for the International Business Methods of the company.

The trouble came up last month when IBM stopped selling most of its products in Australia in protest against the government-sponsored Trade Practices Act, as reported in this column last week.

Since then, matters have not stood still, but the situation is still confused. A new minister of business and consumer affairs has been appointed. The IBM managing director has met with both outgoing and incoming ministers and is reported as saying it appears the IBM contracts will not have to be rewritten (whatever that means).

What is becoming clearer, however, is that what IBM is objecting to is Australia's action to make all firms, large and small, responsible for damages caused by "deceptive" or "misleading" conduct. As its name states, the law deals with trade practices and not trade goods.

The key sections of the act are parts V and VI. Part V outlaws "conduct that is misleading or deceptive or is likely to mislead or deceive." Part VI lets firms recover in the courts for some types of breaches of Part V, provided that all the circumstances (apparently including the proposals given, any advice supplied, etc., as well as the relative knowledge of the two firms) make it reasonable.

Under one of the many "outs" in the legislation, where a supplier draws attention to any defect or advises the customer as to what precautions he should take to check for potential defects, there appears to be no liability at all.

However, liability does exist if, for instance, in a proposal or through some other conduct IBM were to suggest an "unsafe" way of using a product with known deficiencies; or if it overstated the capacity of the system in a deceptive or misleading way.

Now, I can't see anything unreasonable or impossible with that trading standard. If a sort is liable to lose records and not report the loss and if this defect is known to IBM, then I can't see why the Australian law shouldn't hold IBM responsible for deceptive or misleading conduct.

And I certainly can't see why IBM couldn't operate under such a law simply by cleaning up its sales practices, where necessary, in that country.

What IBM seems to want to do is to limit any potential damage award to some multiple of the price of the deceptively presented product.

At current prices, this limited amount would be trivial in any software case. And, because of the industry box-by-box pricing structure, it would probably also be trivial in the case of misrepresented hardware.

For instance, if IBM failed to point out the inadequate checking of tape reading, a multimillion-dollar data base could be destroyed, yet the damages would be limited to the multiplied price of the single tape drive concerned.

Certainly the adoption of this type of limitation would enable IBM to balance its books on an installation-by-installation basis. But it would not satisfy Australia's desire to outlaw deceptive and misleading business conduct.

In fact, the size of the awards needed to change the conduct of powerful multinationals like IBM could well be much larger than this limitation would allow.

So the law is still in place. In Sydney informal expectations are that new IBM contracts will start to be accepted in late August — shortly after Parliament (which would have to approve any change in the law) reconvenes.

The former minister, J.W. Howard, goes to the European Economic Community trade negotiations with greater awareness of the problems of international trade, and Wal C. Fife steps in to oversee the situation that has developed when a sovereign nation meets up with a multinational. It will be interesting and instructive to see the outcome.

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This Is the Federal Parliament House In Canberra, scene of next episode in IBM vs. Trade Practices Act drama.

Letters to the Editor

Adabas Said to Include Nonprocedural Code

The June 13 issue of Computer*world* included a small item about an interface to Software AG's Adabas available with Ramis. The item incorrectly stated that Adabas does not include a nonprocedural language.

The Adabas system has not one but two nonprocedural languages. Adascript for on-line inquiry was released in the fall of 1973. Adawriter for batch report generation was released in January 1976 and enhanced in February 1977.

Also, last February Adascript+ was released to provide an on-line inquiry and reporting nonprocedural language. All of these have been distributed to all Adabas users at no additional charge.

Thomas R. Berriford
Vice-President
Software AG
Reston, Va.

Julian Date Mapping

In reply to Don Dietrich's inquiry about why YYDDD is called a Julian date [CW, July 11], the answer is quite simple.

Under the Julian calendar February always has 28 days, so DDD can always be mapped into the correct month and day. A Gregorian YYDDD would be erroneous in its mapping because of the variable length of February.

You would actually need a YYYYDDD format to correctly account for leap years. (Leap day is not introduced if YYYY is divisible by 100 and not by 400.)

Alexander Nesenjuk
Raritan, N.J.

Keeping an Open Mind

I suppose a program could be considered part of a mechanical device if it appeared in a read-only memory. Otherwise I would think not because mechanical devices do not have parts that disappear when you turn the power off.

It seems to me that getting a patent is a long, involved, expensive process (meaning that I probably couldn't afford it) and getting a copyright is short, simple and cheap.

To me, writing a program is at least in the same category as writing adventure stories. They may or may not involve a lot of "creativity," but all have copyright protection.

Nevertheless, I will consider the suggestion that programs ar~~e in a~~ class by themselves and, likewise, consider any suggested changes to existing laws or proposals for new ones.

It seems to me that any kind of "program copyright" law is going to be very useless unless we can find a way of enforcing it and I think that is going to be impossible.

Leigh Janes
Rocky Hill, Conn.

Another Alternative

You have recently published letters from representatives of various source library systems arguing their relative worth. Panvalet, Slick and Librarian do provide good security and they can be useful for management control, but they are not adequate for an installation that wants to raise standards of programmer productivity.

A library system is used more than any other tool. It can assist a programmer by cutting out a great deal of clerical work. Following are a few drawbacks of the well-known library systems.

Panvalet and Slick automatically resequence a program on every update. This makes it difficult to correlate different versions of a program.

Librarian and Panvalet don't recall previous versions when a program is updated. If you accidentally delete records 500-6,000 instead of 500-600, you may have an extra day's worth of work.

All three systems require corrections to be placed in ascending order.

Records cannot be copied from one place and inserted in another. This is of extreme importance both in rearranging records and in program composition.

Our library system, TXTM, has none of these shortcomings and its text manipulation language is simple and powerful. For example:

If column 10 is an "A," move columns 10-12 to 11-13.

If the character string "ABC" appears in a range of records, change the character which follows to an "X."

Joseph Sider
Joseph Sider and Associates
Encino, Calif.

A Positive Outlook

At least, with all the problems facing us in the future represented by the movie "Star Wars," we will have a standard interface.

Bill O'Connor
Rome, Ga.

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When It Comes to Ethics

Golden Rule Applies to DPer Changing Jobs

By William A. Delaney
Special to CW

A recent Computerworld article discussed ethical, unethical and nonethical conduct on the part of programmers who take programs with them from one job to another and, possibly, hurt a former employer by delivering to a competitor software that was paid for and developed at the former place of employment. [" 'Who Owns a Program' Depends on Type of Software," CW, June 27].

The question of ethical behavior is a difficult and very subjective one. It can sometimes depend on where you stand. If, for example, you are the employer and pay a programmer a good salary for several years to develop software, you can argue that it belongs to your company.

The programmer can be ego-involved and determine that it is his work and brainpower that developed the software. The software therefore is rightfully transferable when the programmer takes on a new position.

There is no easy solution regarding the ethical question, and no set of guidelines will ever make anyone honest. This comes from within each of us.

I suggest, however, that the following factors be considered if anyone is trying to determine whether the transfer of a program from one company to the other is ethical.

- Did the new company hire you specifically because it knows exactly what you are doing? Is it in direct competition with your present or former employer for a particualr job or series of jobs? Is it more interested in specific work you are doing rather than your general experience and education?

If the answer is yes, the possibility of unethical conduct may exist.

- Did the new company ask you to bring specific programs, modules or subroutines with you? If so, be careful. The possibility of unethical or even illegal conduct may exist.

- Did you sign any conflict-of-interest statement at your former place of employment as a condition of employment?

If you did, then observe it now, even if you don't want to, because you gave your word in advance. Next time, don't give your word. Don't retroactively decide the argreement was wrong.

This is a rationalization of your behavior, because you don't want to keep your word.

- If you did not sign any conflict-of-interest agreement, you may be legally free to do what you wish; ethically, however, you may not be if you determine that bringing a program with you could damage your former employer's opportunity for business, expansion or growth.

No one can stop you on this one but your own conscience.

- If you find yourself taking program listings, printouts and other such data with you, then you may be in the area of unethical or illegal behavior. Especially if you are doing it secretly.

Ask your boss if he minds if you take it and see what the answer is. If you don't ask, watch out; you are in unethical territory again.

- You were paid every month for as long as you worked where you worked. The employer paid you for what you did and, legally, the result of your work belongs to the place that paid you to develop it.

When a carpenter is paid to build a house, he doesn't own it when it's done. Consider software in the same way.

- Ask yourself the following question: Would you approve of an employee doing what you plan to do if you owned or represented the company or organization for which you work or formerly worked? Then act accordingly.

If still in doubt, ask a qualified third party. (That's one of the jobs for clergymen, if you would care to discuss it with them, and it is guaranteed to be confidential.)

Don't ask relatives or friends — they won't be objective. They will tend to agree with whatever you say on the subject.

Reader Commentary

Trying to see it that way may help solve some questions of ethics. No one can stop you using your experience, education or training on a new job, and this is easily transferrable from one job to another. Indeed, that is what employers want when they hire experienced personnel.

If, however, in addition to taking copies of programs to your new job you use them very soon, and relatively unchanged, then be careful because this could constitute unethical conduct.

"Do unto others as you would have them do unto you." You can't miss if you use this rule, and it is easily transferrable from job to job.

Deloney is president of Anolysis ond Computer Systems, Inc. in Burlington, Moss.

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Constructive Criticism of NCC Welcomed

By Dr. Roger M. Firestone
Special to CW

As a member of the Program Committee of the 1977 National Computer Conference, I am writing in response to the letter from W. Thad Lee [CW, July 18].

Lee complained about the lack of parking, the lack of access to sessions for handicapped attendees and the crowding at certain sessions.

It is difficult to attach blame to the American Federation of Information Processing Societies (Afips) for the lack of parking space in downtown Dallas; certainly few people expected to find parking readily available in Chicago in 1974.

Unlike Chicago or New York, however, free transportation was available to conference attendees which, it was hoped, would reduce the need for parking.

Regarding architectural barriers to the handicapped, it was unfortunate the program booklet did not include the customary map of the convention center, which would have indicated the location of elevators. Perhaps they should have been marked clearly.

One elevator for passenger use was available just off the registration area, and it did receive frequent use.

I am confident further attention will he given to this area at future NCCs; the fact that buildings constructed prior to current federal guidelines on handicapped access must still be used will impose some limitations on how much improvement can be made.

As it was I who made the room assignments for the NCC, I must accept full responsibility for the problems and difficulties which resulted.

Room assignment is a difficult task. Having been a session chairman and speaker as well as an attendee at prior NCCs, I am aware of the many frustrations that improper room size can produce.

Lee should recognize that placing a session with 30 to 50 attendees in a room with capacity of 800 can be very damaging to a speakers' ego and equilibrium; additionally, it may discourage attendees from asking questions.

Room assignment was undertaken with only a limited number of rooms available for assignment. It was desired to achieve a physical grouping of session "tracks" with similar themes.

This indicated that the use of the theater building was not suitable for technical sessions; instead, it was used for personal computing sessions and some exceptionally large sessions.

Moreover, the professional development seminars were allocated some of the larger rooms; that they sold out to capacity indicates this was desirable and necessary. Others of the larger rooms were needed for exhibit registration and similar administrative purposes.

Reader Commentary

Past experience has shown the most technical sessions have usually had the smallest attendance because of their specialized nature. In this year's program, the technical tracks were assigned to smaller rooms for this reason.

However, the technical tracks also included some very popular speakers (Herb Grosch, Gene Amdahl and Ed Yourdon, to name a few) and two sessions were moved to accommodate crowds when the theater was available for reassignment.

Note that the ratio between the largest and smallest sessions on the tracks in question exceeded 60. The resulting problems should be obvious.

Best Ever

In many ways, the Dallas NCC was indeed the best ever for the largest number of people ever. Seldom will any enterprise of this size be run entirely without difficulties.

This year's steering committee is anxious to receive constructive suggestions of how improvements might be made in next year's conference. I am sure constructive criticism would be welcomed.

Are DPers Disconnected?

(Continued from Page 13)

Oh God, nice, NICE; was that all? That beautiful pastel city on a hill where the mist stole in each evening to the call of the fog horn. The feeling of romance was, I thought, everywhere in the lights of the night. And he said, "Nice."

What happens to a man's awareness of the sights and sounds of LIFE? Were they ever there, or were they lost somewhere in that damn computer which has no capacity to feel — or to love?

I don't know. Perhaps it's the inherent nature of the computer man — precise, exact, logical. It's true, San Francisco *was* nice, after that long Christmas day it *was* sensible to go to bed, and the sights and sounds are subjective, and so is love — thank goodness.

It's okay. This "human" has been "disconnected."

I'm glad you're writing about humans.

Painter Hoffman
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Reader Commentary

Reader Finds Reaction Confusing

Both Stone, Tannenbaum Have Good Points

By H. Andrew Shirley
Special to CW

I read with great interest Jack Stone's July 18 reply to Saul Tannenbaum on the question of professional ethics in training Iranian policemen in computer technology — and I discovered an amazing reaction on my part.

As I read Tannenbaum's letter, I felt sincere empathy with his point of view. At the close of his remarks I wanted to run up the stadium steps waving an American flag and shouting slogans about human rights.

Then I read Stone's reply and found I could relate nicely to his arguments for conducting the training program as he had.

To say the least, I was perplexed at my confusion about what I really felt and believed about this important issue.

I began contemplating the situation and determined that I agreed — and disagreed — with both men. Tannenbaum raised a very relevant question for today's DP community, but his approach seemed to be very idealistic. Although ideals should certainly be as high as possible, reality often dictates a different tune (it's like those TV commercials aimed at the "typical American" — there just ain't no such critter).

Tannenbaum's concern is commendable and I hope he continues to maintain his apparently high degree of integrity, but no father is going to deny his hungry child bread because he doesn't like the way the baker parts his hair. Instead, he might try convincing the baker to change his hairstyle.

As for Stone, given the same set of circumstances I would have done as he did — forge ahead with the training program. However, I have the impression, and perhaps erroneously, that Stone believes he is not his brother's keeper.

Professional ethics sometimes walks a very thin line where a mere change in attitude can spell the difference in what's ethically right or wrong. Maybe Stone was only miffed over what he took to be grave and serious accusations, but whatever the motive his rebuttal reeked of callous indifference which, in my opinion, stood on the brink of being unethical.

To kill a sick animal because he's sick is one thing, but to kill a sick animal because you like killing . . . I think you see my point.

At the close of his statement Stone questioned whether he should become a committee of one and "rock the boat" when everyone else seemed content to stay seated.

I don't know Stone's religious preference, but I would recommend he read the story of Elijah in the Bible (I Kings, Chapter 19), where the Lord demanded to know why Elijah was hiding in a cave when he should be out taking a stand for God. Elijah's answer was, in effect, that he was a committee of one and there was no use trying. The Lord then replied that this was not so, there were 7,000 more of whom Elijah knew nothing.

The application is clear. If each one of us refuses to rise and be counted on an individual basis, we might as well hide away in a cave. But when we do speak out, we find others around us also crying out and presenting a unified front.

Stone's reasons for doing what he did seem valid to me; our government does have a friendly policy toward Iran and it is true someone else would have done the work if Stone's organization had not.

However, I wonder if Tannenbaum's original question of unethical practices is closer to the truth than Stone thinks, but for entirely different reasons.

The DP community needs to be concerned about privacy legislation, human rights and professional ethics and it needs to take a realistic approach to these issues, but hiding one's head in the sand is no more realistic than trying to ride a rainbow.

Shirley is DP monoger of Mulberry Construction Co. in Mulberry, Flo.

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Value of Software Copyright Lies in Incentive to Create

By Jonathan Sachs
Special to CW

Author John Hersey has argued that copyright protection is inappropriate for computer programs because a program is a "mechanical device, which is engaged in the computer" [CW, July 4]. I am not convinced.

To accept this argument, we must strain the concept of a "device" beyond its usual limits — an effort which is awkward and unnecessary.

The Supreme Court used Hersey's argument in 1908 to deny copyright protection to musical compositions that were pirated by a piano roll maker (White-Smith Music Publishing Co. vs. Apollo Co.). Congress promptly incorporated such protection in a revision to the copyright law.

Recording of copyrighted music has been regulated by the law ever since, and neither the law nor the recording industry has suffered.

A program that is installed on a computer is nothing "strikingly new in our culture," as Hersey contended. It is not essentially different from music on a phonograph record — or a piano roll.

The problems of imitation, transaction charging, networking and so forth all have analogues in the recording and broadcasting industries. We are dealing with problems that have been solved before, and we need not resolve them from scratch.

Copyright and similar protection is a legal "monopoly license" designed to ensure creative people receive a fair reward for their efforts and so give them an incentive to work. It is settled law that the protection should be broad enough to accomplish this purpose — and no broader.

The program protection issue is therefore basically economic: What protection is needed to ensure that programming develops vigorously, as an art and an industry? Hersey's arguments about what a program "is" are off the point.

I believe that copyright protection is quite adequate for computer programs. No major innovations are necessary.

Sochs, troined os on ottorney, is o freelonce writer in Son Corlos, Colif.

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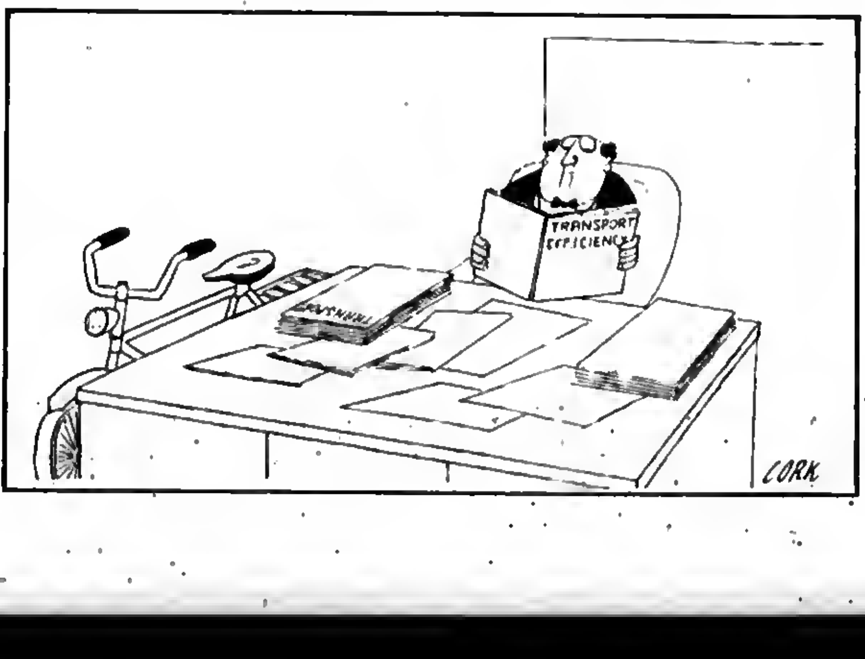

'Midas' Controls Add to DG's RDOS

NEWTON CENTER, Mass. — The Management Information Data System (Midas), created by Management Techniques, Inc. (MTI) to simplify operations on full-sized machines, has been adapted to the Data General Corp. RDOS environment, providing users with facilities not available from DG, according to MTI.

Under Midas, all the functions of the system are performed by control programs invoked by operator-entered commands. The ultimate goal of the Midas development is to support "operatorless, programmerless, skill-less data processing," a spokesman explained.

The current Midas provides three levels of protection for the user, he claimed. A log-on procedure, for example, prevents unauthorized users from gaining access to the system in the first place, he said.

Although Midas has the ability to support many commands, installations often wish to limit the number and type of instructions available to their operators. A "profile" routine screens incoming commands against a user-defined list of acceptable ones, processes those that are valid and blocks those that are not.

Finally, the system has the ability to monitor runs, tracking successful execution of predecessor runs before allowing the current work to get under way but stopping execution if prior work remains to be done.

Also built into Midas, the spokesman claimed, is a facility for storing strings of commands - including conditional branches — for execution upon later entry of a single routine name.

Midas runs in 16K under RDOS on any DG machine which supports that operating environment. The MTI software is available for $1,000 plus $10/mo maintenance or as part of the cost of various application programs also available from MTI.

MTI is at 28 Tanglewood Road, Newton Center, Mass. 02159.

'Culprit' Eases Formatting

WELLESLEY, Mass. — Release 4.3 of the Culprit Output Processsor package from Cullinane Corp. is said to provide automatic report formatting and an extended macro facility to ease coding and simplify report alterations.

The Automatic Header Generation supports three forms of column labelling: posting the predefined field name; posting a literal, but leaving placement up to the user; and posting a literal which the system always associates with defined fields, a spokesman said.

The Info-Column Specification feature allows the user to leave the positioning of columns across the page up to the system. This facility can be combined with the Automatic Header Generation or used independently, he added.

Release 4.3 extends the previous COPY facility that allowed users to combine sections of existing code to form new report specifications. With the update, users can delete or resequence specified parameters, change print formats or alter logic to produce new reports without coding entirely new parameters.

The enhanced Culprit also supports floating dollar sign specifications and user edit masks that perform a range of functions including zero suppression, decimal point insertion and negative value specification.

Culprit can be used in any IBM 360/370 environment from DOS through OS/MVS. It requires a minimum partition of 64K bytes to handle two or three reports under DOS.

The basic package costs $20,000 plus 10% each year for maintenance after the first year. The features in Release 4.3 are included in the various specified versions of Culprit as well, Cullinane said from 20 William St., Wellesley, Mass. 02181.

Special Modules Extend Fixed Asset Accounting

SANTA CLARA, Calif. — Construction in progress, asset maintenance and leased asset reporting are capabilities included in an enhanced version of the Fixed Asset Accounting System now available from Data Design Associates, according to a spokesman.

The base system, written in ANS Cobol and implemented on a wide range of hardware, supports book and tax depreciation accounting, the federally sanctioned Asset Depreciation Range reporting and the Securities and Exchange Commission's Replacement Cost Accounting, he noted.

In addition to its newly available property accounting capabilities, the package includes a user-controlled report writer feature. This gives users an expanded level of flexibility in building their property data bases and extracting reports in any desired format, the spokesman stated.

The software runs in 64K bytes., It has been installed on IBM, Burroughs, Honeywell, Univac, Data General and Hewlett-Packard systems and efforts are under way to include Digital Equipment Corp. and NCR equipment, he added.

The base package costs $12,500, but typical configurations are higher than that, depending on which of the specialized modules are selected.

Data Design Associates is at Suite 418, 1333 Lawrence Expressway, Santa Clara, Calif. 95051.

'Mark IV' Version Handles EEO Jobs

WOODLAND HILLS, Calif. — The 43 standard reports available with the Mark IV/EEO & Affirmative Action Reporter package from Informatics, Inc. are said to incorporate all aspects of compliance reporting requirements, from evaluation of workforce composition to comparisons of external labor markets.

A basic Mark IV system and the EEO Report module cost $21,000; current users of Mark IV can get the module by itself for $3,700.

Informatics is at 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

'QShare' Aids Spooling

GREAT NECK, N.Y. — QShare from Labyrinth Systems Ltd. is an enhancement to the Power/VS queues spooling software supplied by IBM that allows multiple CPUs in a shared environment to access the same Power/VS and data files.

Although each CPU in the configuration must have a memory-resident copy of Power/VS to utilize QShare, each need not have its own reader, punch, printer or other "unit record" devices, according to a Labyrinth spokesman.

The Labyrinth package can locate the next available device of the type needed and route the job to it, even if it is not attached to the CPU that initiated the job, he said.

On the other hand, attaching all unit record devices to a single CPU optimizes the effectiveness of QShare by eliminating its need to search through other systems for available peripherals, he added.

The ability to match available devices to current work requests may improve throughput performance as well as save the cost and space requirements of equipment which might be unnecessary with QShare in place, Labyrinth said.

A perpetual license for QShare costs $7,500. Lease and rental agreements are also available, Labyrinth said from 17 Barstow Road, Great Neck, N.Y. 11022.

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Data Basics

Picking a Winner — Part I

Technicians Alone Should Not Select DBMS

By Robert B. Chamberlain
Special to CW

An idea currently prevalent is that selection of a data base management system (DBMS) is rather exclusively in the purview of an installation's senior technical personnel — those honchos and near-honchos who possess an almost mystical combination of arcane knowledge about the shop's current application systems and well-honed analytic skills regarding state-of-the-art softwre.

I believe giving these "phenoms" DBMS selection powers (with perhaps the sop to user departments of having an onlooker present with the right of free speech) is somewhat akin to leaving the fox in charge of the henhouse.

The issue is not the adequacy of the analysis of a package's technical credibility, but rather the stress put on that aspect of package selection and whether proper planning has been done prior to the technical evaluation of a package — in other words, whether such data base amenities as a proper information flow analysis (IFA) and service analysis have been observed [CW, May 23, 30].

The performance of such essential preselection and preinstallation activities will, if done with a proper commitment, sufficiently involve key individuals from user departments to the point where they will have gained insight into data base in philosophy and practice and, by virtue of their involvement, have contributed key input to the package selection process and therefore have become an integral part of the process.

Lukewarm user involvement only brings a token commitment of the user representative. The old cry, "I tried to tell them but they wouldn't listen to me," is guaranteed to come up at the first sign of a crunch (and some crunch is historically inevitable).

'Vested Interest'

Relying on senior technical people as experts on current applications creates a "vested interest" problem. This problem arises not from a failure to completely understand the present system, but from a reluctance to fully appreciate the possibilities inherent in a new one.

This reluctance, in turn, comes from a desire to protect a position of expertise (job security, in other words) and from another natural human tendency, that of re-creating the known in preference to doing the unknown.

In data base terms, this means the conversion of existing systems to DBMS systems instead of a data base-oriented redesign of existing systems. A foot-in-the-door to the conversion approach can come from an approach which says, in effect, "We in DP know the system, so why bother the user by asking questions about what he needs."

User Excluded

The user has now been effectively excluded from the problem-defining environment (in our data base terms, an IFA and service analysis), an action which guarantees his exclusion from the problem-solving environment (data base file design and DBMS package selection).

It should be observed that there is no advocacy here of having underwriters and loan officers evaluating recovery/-restart capabilities and speaking knowingly of inverted files and ring structures. That sort of technical evaluation does belong properly to the best of the DP staff (perhaps working with a consultant to help offset what might be politely called vendor "enthusiasm" regarding their products).

Technical evaluation, however, is only the final stage of the data base effort, an effort properly seen as a corporate commitment to a data base effort. An example from another aspect of corporate life will illustrate the nature of the data base package selection effort.

Assume that a Personnel Department is encountering increasing strain in meeting its responsibilities to and inquiries from other departments in a corporation. Assume further that several approaches to solving Personnel's dilemma were available and the selection and acquisition of one of them would entail both time and money.

It is highly unlikely this decision could be made in a vacuum by Personnel Department staff alone. It is furthermore unlikely Personnel could unilaterally make a formal recommendation without a give-and-take with user departments regarding the logic of the various solutions and their impact upon the user and his current and future requirements.

Point of Absurdity

And it is even more unlikely, to the point of absurdity, that Personnel would claim that it alone had the real truth and right of possession to personnel data.

Yet this same type of thinking is not uncommon in DP, both in its everyday working and in its data base package selection process.

In his next article, Chamberlain will discuss a "political solution to a political problem — the selection of a DBMS."

Chamberlain is a senior consultant, information systems, with CACI, Inc. — Commercial, New York, now on assignment in Europe.

Course Details Report Writer Use

KANSAS CITY, Mo. — Students completing the ANS Cobol Techniques/Report Writer course module from The Edutronics Group can decide when conventional report processing should be used instead of the Cobol Report Writer feature.

Intended for DP managers who need an overview of the features's capabilities and limitations and for programmers and operations personnel who may need to produce "quickie" reports, the course should take three hours, depending on the skill level of the user, a spokesman said.

The course shows that most printed reports have certain elements in common and that there is an inherent logic to using a generalized routine such as Report Writer.

It shows how to use the Cobol feature but, through example, the course also shows when special needs make the generalized approach inappropriate, he noted.

The training program is available under Edutronics' library lease plan. It can also be purchased for $390, from 3435 Broadway, Kansas City, Mo. 64111.

Infonet Installs Modeling System

EL SEGUNDO, Calif.— Sciconic, a mathematical programming system developed by Scicon Computer Services Ltd. of England, is now available on Infonet, Computer Sciences Corp.'s (CSC) time-sharing service.

Working with a unique high-level language, the Sciconic user can find an optimum solution to a problem having millions of possible answers, CSC claimed.

CSC is headquartered at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

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Ontario. Data General Europe, 15 Rue Le Sueur, Paris 75116, France. Data General Australia, Melbourne (03) 82-1361.

Systems Seminars Set

WELLESLEY, Mass. — A five-day seminar on business systems analysis and design will be held in Nashville, Tenn., late this month and repeated in Toronto, Seattle and here in Wellesley later.

Sponsored by Honeywell Information Systems, the course should be useful to systems analysts, programmers, staff technicians and user department personnel, no matter what kind of DP equipment they have available, an HIS spokesman said.

The course shows how to develop and design systems. Lectures present an approach and workshops give "hands-on" experience using it.

The course costs $395/person, according to HIS's manager of educational services, 110 Cedar St., Wellesley, Mass. 02181.

More RJE Support, Too

Sycor Adds Basic for 440 Systems

ANN ARBOR, Mich. — Sycor, Inc. has introduced Basic for use on its 400 series of distributed data entry/-processing systems. The newest of Sycor's languages provides users with mathematical and problem-solving capabilities generally associated with time-sharing computers, a spokesman noted.

At the same time, the company also introduced Burroughs Remote Job Entry support for its 440 distributed data entry/processing system. This provides Burroughs users a means of accessing peripherals unique to the Sycor system as well as devices with which they may be more familiar, he added.

Sycor Basic supports both sequential and direct-access files, all of the common algebraic operators including arithmetic and relational symbolics, concatenation and Boolean logic capabilities, Sycor said.

Exponents to the power of +38 or -39 are provided, while three-dimensional arrays are limited by available memory. Floating-point, single-precision numbers may be up to seven digits, the spokesman added.

On a more scientific side, Sycor Basic supports the trigonometric functions — including sine, cosine, hyperbolic cosine and others — as well as logarithms and square root, he said.

Even while a 400 series processor is operating in Basic, data entry applications can be operating through other keyboards, he added.

The Basic software will be available for a one-time charge of $750 in the fourth quarter of the year, Sycor said.

The Burroughs support will be available for customer use by the end of next month, the company stated.

CDC Disks, DOS/RS Now on 360

PARK RIDGE, Ill. — Users of IBM 360/50s or 65s running under Dearborn Computer Co.'s DOS/RS operating system can now include Control Data Corp. 38301/33301 disk subsystems in their configurations, according to a Dearborn spokesman.

A joint development effort by CDC and Dearborn has made it possible to attach the 38301 controller to the IBM selector channel, with the 33301s — equivalent to IBM's 3330-1 disk drives — then cabled to the controller, he said.

The CDC 38301 microcode has been extensively modified to handle the 360 selector channel times instead of the 370 block multiplex channel times for which the controller's code was originally designed. The microcode changes are available from Dearborn on a floppy disk, the spokesman noted.

Programming added to DOS/RS to handle the CDC peripherals increase the memory requirements of the operating system by about 1,400 bytes, he said.

Version 6 of DOS/RS, currently available, costs $13,750. Version 7, which will include 10-partition support, is scheduled for delivery at year-end and will cost $19,750.

Dearborn is now located at 1460 Renaissance Drive, Park Ridge, Ill. 60068.

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DDS Rates Filed to Boost Users' Bills 5%

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — AT&T has filed new rates for its Dataphone Digital Service (DDS) that would increase users' bills an average of 5%.

The proposed higher rates were filed with the Federal Communications Commission (FCC) here to be effective Oct. 23 if approved by the commission.

The rates were filed in response to an FCC order which required Bell to cover the costs of providing DDS in the rates it charges to users. The FCC order was issued after the commission determined DDS rates were too low.

DDS is a digital service for data communications users that is available at transmission speeds of 2,400-, 4,800- and 9,600 bit/sec, 56 Kbit/sec and 1.544M bit/sec in 24 metropolitan areas.

The effect of the proposed rates will be to increase costs for short-haul, low-speed users while decreasing costs for long-haul, high-speed users, according to an AT&T spokesman.

The rates filing was the second of a two-step response to the FCC order that AT&T has undertaken to bring DDS rates in line with the cost of providing the service. In March, AT&T implemented "interim" DDS rates which were an average 20% higher than the tariffed charges in effect at the beginning of 1977.

Under the latest rates, a customer operating between New York and Chicago faces both increased and decreased costs at the lower DDS speeds. At 2,400 bit/sec, the January rate was $476.92/mo; this would jump to $509.24/mo.

At 4,800 bit/sec along the same route, the old rate was $688.44/mo while the new rate would drop to $674.64/mo, AT&T said.

At higher speeds and distances, users would benefit from rate reductions. From New York to Los Angeles at 9,600 bit/sec, the old rate was $2,591/mo while the proposed rate would be $2,273/mo. At 56 kbit/sec, the old rate was $10,647/mo while the new rate would be $8,666/mo, AT&T said.

Rates at 1.544M bit/sec remain unchanged.

The interim rates now in effect represent a 20% increase over the rates in effect last January; the latest rates are 5% higher than the January rates. As a result, the proposed rates should average about 15% below the interim charges, the AT&T spokesman said.

Users and other parties interested in commenting on the proposed DDS tariff should respond to the commission's Common Carrier Bureau by Aug. 19. The bureau is currently analyzing the AT&T proposal, an FCC spokesman said.

No decision has yet been made on whether the commission will approve, reject or suspend the rates pending a regulatory proceeding.

Raytheon Extends PTS/ 1200 Downline

NORWOOD, Mass. — Raytheon Data Systems Co. has introduced a software enhancement for its PTS/1200 line of distributed systems which it said permits users to extend six capabilities of those systems to smaller remote locations within distributed networks.

PTS/1200 systems with the downline terminal support enhancement reportedly allow users to perform source data entry and preprocessing, file and record maintenance, unattended two-way communications, standalone batch processing, report printing and interactive transactions with a host mainframe in IBM 3270 emulation.

With the capability, users can install PTS-100 programmable terminal configurations in smaller offices which may function as satellites to the PTS/1200 site, according to Raytheon.

The downline keyboard/CRT terminals connected to PTS-100 control units can operate in emulation of IBM 3270 equipment, a spokesman noted. Normally, separate communications lines between those PTS-100 configurations and a host mainframe would be needed to tie smaller offices into a distributed computing network, he said.

Data is transmitted and received between PTS-100 control units and the host PTS/1200 controller at speeds up to 4,800 bit/sec under IBM Binary Synchronous Communications protocol, the company stated. Data transmitted from PTS-100 controllers is typically stored in the PTS/1200 and forwarded to the mainframe when necessary at 9,600 bit/sec.

The PTS/1200 controller handles communications between its PTS-100 systems and the mainframe; programs written for local PTS/1200 terminals in Raytheon's Macrol programming language can be modified for communications with remote PTS-100 terminals, the spokesman said.

There is no charge for the downline terminal support software; the modem adapter needed to link a PTS-100 to a PTS/1200 is available for $21/mo. The enhancement will be available in the fourth quarter from Raytheon at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

AT&T Links Non-Bell Units to TNS

NEW YORK — An AT&T plan to enhance its DP-oriented Transaction Network Service (TNS) in 1978 will allow users of the communications service to attach non-AT&T automatic teller and point-of-sale terminal devices.

The enhancement is an interface designed to support character-polled terminals.

The NCR Corp. Model 279 financial teller terminal is the first independent device selected for use on TNS, which is operational in Washington through Pacific Northwest Bell and also in Minnesota, according to an AT&T spokesman.

TNS was developed to meet the needs of high-volume, short-message inquiry/response applications. It offers network and message control and low error rates with two methods of terminal access — dial-in and polled, the spokesman said.

The dial-in mode accommodates Bell Touch-Tone telephones, Transaction I and II telephones and compatible customer-provided equipment.

The polled access mode accommodates the Bell Transaction III terminal and customer-provided equipment using the same protocol.

The enhancement should keep the cost of using TNS the same as it has been since operations began at the end of last year, according to the spokesman.

There is one exception, however, because compatible terminals must be four-wire devices. If they are not, the additional expense for an extra two-wire loop is about $10- to $15/mo, he noted.

Bell's TNS may be expanded to other states, according to the spokesman. That will depend, however, on the particular Bell company in each state and whether users find the service attractive, he added.

Prentice Upgrades Speed of SLD

PALO ALTO, Calif. — Prentice Corp. has enhanced its synchronous line driver (SLD) to a maximum speed of 28.8 kbit/sec.

The enhanced switch-selectable SLD 28.8(M) is capable of transmitting data up to six miles over nonloaded cable, the company said.

With its multiple data rate, IBM users can upgrade from 2,400- to 4,800-, 7,200-, or 9,600 bit/sec, Prentice noted.

The SLD incorporates diagnostics including local and remote loop-backs, nine LED indicators and pseudorandom word generation for self-testing, the company added.

A rack-mount version of the high-speed SLD costs $790, according to Prentice at 795 San Antonio Road, Palo Alto, Calif. 94303.

HIS Sets Four-Day Courses

WALTHAM, Mass. — Honeywell Information Systems, Inc. is offering a number of four-day programs on the subject of data communications intended for programmers, analysts, designers and managers of small/medium systems.

The courses are designed for the user evaluating or planning a system using data communications, whether or not Honeywell equipment is used, according to a HIS spokesman.

The first course is scheduled for Aug. 22-25 at the HIS offices in Cincinnati. The courses will also be held in New York City Sept. 19-22; in Minneapolis Oct. 17-20; in Columbia, Md., Nov. 14-17; and in Detroit Dec. 12-15, he said.

Participation in each seminar costs $395. Further information can be obtained from Dave Cook, HIS' manager of educational services, at 110 Cedar St., Wellesley Hills, Mass. 02181.

Vadic Introduces Registered DAAs

MOUNTAIN VIEW, Calif. — Vadic Corp. has brought out two Data Access Arrangements (DAA) which have been registered under the Federal Communications Commission's (FCC) long-form Rule 68.

The single-channel VA851 and the dual-channel VA852 have transmit-level control circuitry which continuously monitor each modem's output level, Vadic said.

If the output exceeds the programmed level, the circuit automatically reduces the level to protect the line. An LED simultaneously provides an indication of that situation to alert the operator, Vadic added.

All circuitry is mounted on a printed circuit board which occupies two slots in a standard Vadic chassis.

The VA851 costs $135 and the dual-channel VA852 is priced at $215, Vadic said from 505 E. Middlefield Road, Mountain View, Calif. 94043.

DTC Raises Dumb Devices' IQ

CAMPBELL, Calif. — Data Terminals and Communications (DTC) has a compact computing system that can make any Ascii terminal an intelligent device, according to the firm.

The Microfile combines an Intel 8080A microprocessor with one or two dual-floppy disk drives to give up to 1.2M bytes of on-line storage and up to 56K bytes of random-access memory (RAM); DTC Extended Basic software is also available.

A terminal used with the system can interact through an RS-232 interface with either a host time-sharing system or a second terminal at speeds from 100- to 9,600 bit/sec, according to DTC.

Standard Software

Standard software includes a text editor. Also included are mailing list maintenance and an automatic letter writer.

Prices start at $4,595 for the Model MK IIA with the single-drive dual floppy and at $6,750 for the MK IV with two dual-floppy drives, each has 8K of RAM. Extended Basic is a $500 option.

DTC is at 1190 Dell Ave., Campbell, Calif. 95008.

Omron CRT System Has Floppy Disk Unit

SUNNYVALE, Calif. — Omron Electronics, Inc. has unveiled the Model 8035, a stand-alone CRT terminal system based on an Intel Corp. 8080 microprocessor and featuring a floppy disk subsystem.

The intelligent terminal system includes an IBM 3740-compatible dual-floppy disk providing up to 4M bits of auxiliary data storage and allowing generation of a library for program loading, according to the firm.

System functions are held in random-access memory from 20K bytes in the basic Model 8035 to an optional 65K and are under control of the floppy disk operating system, Omron stated.

The operating system software package consists of an assembler, editor and debugger as well as file management routines to handle file creation, deletion and modification, Omron said.

Utility programs which are said to enhance operating simplicity are included in the floppy disk subsystem package.

Because the terminal system offers programmability, the 8035 can be used for application-specific program development, Omron claimed.

These programs optionally can be translated into firmware-based custom terminal designs by Omron and manufactured in quantity, it added.

The terminal system can transmit data at speeds up to 9,600 bit/sec. It comes with a CRT, alphanumeric keyboard with separate numeric-and function-key pads and an RS-232C interface.

Optional peripherals, such as a 120 char./sec printer, can be added to the terminal system which costs $7,200 from Omron at 432 Toyama Drive, Sunnyvale, Calif. 94086.

Terminal Transactions

AJ Boosts Speed Of Teleprinters

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has a 1,200 bit/sec full-duplex option for its AJ 860 and AJ 860/A desktop printer terminals.

Option 860/120 permits either unit to operate at line speeds of 1,200 bit/sec in full-duplex mode over leased lines or the switched network, according to a spokesman.

Terminal buffer overflow protection for both terminals is provided through the use of the off/on Ascii control code sequence, the company added.

Either teleprinter equipped with the option can also operate at 10-, 30-, 45-, 60- or 120 char./sec.

Option 860/120 costs $400 and will be available in the fourth quarter from AJ at 521 Charcot Ave., San Jose, Calif. 95131.

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Bits & Pieces

Hand-Held Unit Scans OCR-Imprinted Tags

DAYTON, Ohio — A hand-held scanner which reads prices and other information printed in an optical character recognition (OCR) font on merchandise tags in retail stores is available from NCR Corp. here.

The NCR 7867, a six-ounce pistol-shaped device, is immediately available as an option with the NCR 280 and 250 systems. It will be available for the NCR 255 and 2151 systems in the future, according to a spokesman.

Users can specify the type of format used on merchandise tags by filling out a specification sheet, the spokesman said. The unit is then delivered with a programmable read-only memory chip which incorporates those specifications, he said.

The scanner costs $1,500 and is available in both U.S. and international versions.

Memory Map Runs CP-V System

IRVINE, Calif. — A CPU enhancement from Telefile Computer Products will permit Xerox Corp. Sigma 5 users to process CP-V and CP-R software, a Telefile spokesman claimed.

The Telefile T8215 Memory Map is supplied as a package consisting of three logic modules, a diagnostic program tape and a Telefile CP-V starter tape. All memory map hardware is mounted inside the Sigma 5 CPU cabinet, the spokesman said, noting a limited number of internal writing changes are also required, but these adhere strictly to the Sigma 5 logic-loading specifications.

The memory map costs $18,200 from the firm at 17131 Daimler St., Irvine, Calif. 92714.

Reader Creates Dry Prints

ST. PAUL, Minn. — A compact microfiche reader/printer that produces dry-silver prints from fiche produced from source documents or by computer output microfilm (COM) systems is available from the 3M Co. here.

The 800 reader/printer produces a print in 10 sec, a spokesman said. It creates prints of 8.5- by 11 in., 11- by 8.5 in. and 8.5 or 11 in. square.

The 800 reader/printer costs $1,336 from 3M at P.O. Box 33600, St. Paul, Minn. 55133.

Burroughs Adds Mainframes To B3800 Medium-Scale Series

By Frank Vaughan
CW Staff

DETROIT — Burroughs Corp. has added two models to its B3800 medium-scale mainframe series.

The B3834 and the B3835 share the same 4MHz CPU, according to a spokesman. The additions to the line are equivalent in power to the B3830, the B3834 differing in that it is limited to 500,000 bytes of memory and 32 I/O channels as opposed to the 3830's 1M byte and 40 I/O channels. The 3835 differs in that it uses a more advanced memory technology requiring less space and lower costs, the spokesman explained.

The memory technology featured in the B3835 is 4K bit/chip metal oxide silicon (MOS). The 4K technology provides for a reduction of up to 25% in floor space for the system as opposed to other B3800 systems, he claimed.

Both systems are object code-compatible with all other Burroughs medium-scale systems and programs can be run with no recompilation necessary, he said.

Peripheral interface requirements for the two systems are the same as for other Burroughs medium-scale systems, the spokesman said. Both systems utilize an I/O subsystem which offers a Data Link processor for each channel. The processor cycle times vary with the peripheral, and channel transfer rates up to 4M byte/sec can be attained, he explained.

Memory access time on the systems is 500 nsec for every two 8-bit bytes.

A basic B3834 features 100,000 bytes of error-correcting, 1K bit/chip memory expandable in 50,000-byte increments to 500,000 bytes. The system comes with 16 I/O channels expandable to 32 channels. Equipped with operator display and console, the system costs $231,320 or $5,275/mo on a five-year lease. Lease prices include maintenance, the spokesman explained, noting the system is available for immediate delivery.

The B3835 in a basic configuration comes with 16 I/O channels expandable to 40 channels. It features 500,000 bytes of 4K bit/chip memory expandable to one million bytes. The system, with operator display and console, costs $317,560 or $7,550 with maintenance on a five-year lease. First deliveries are scheduled in the first quarter of 1978, the spokesman said.

Self-Sharpening Burnisher

Devices Clean, Certify Tapes

WOODLAND HILLS, Calif. — Two products, a tape winder/cleaner and a winder/-cleaner/certifier, have been introduced by Data Devices International, Inc.

The series 310C winder/cleaner features a self-sharpening multicontact burnisher which cleans the oxide surface of tapes. Two rolls of continuous-filament cleaning fabric remove dust attracted to the reel by static electricity, a spokesman said.

The series 310C is available in versions to handle .5-, .75-, 1- and 1.5-in. tapes. Winding control permits tape to be cleaned and wound at between 300 ft/min and 1,200 ft/-min. The unit sells for $4,995.

The series 330 winder/cleaner/certifier retains many of the features of the series 310C, the spokesman claimed. It uses separate, three-channel ferrite record and reproduce heads. The erase head erases the full width of the tape, he said, noting the head life is 3,000 hours at certify speed, the equivalent of 12,000 reels of 14-in. tape.

The unit's three-speed system operates in a bidirectional mode with either automatic or manual control.

The unit sells for $10,950 from the firm at 6301 DeSoto Ave., Woodland Hills, Calif. 91367.

Paper Feeder Bows

HAYWARD, Calif. — Qume Corp. has introduced a paper feeder for its daisywheel printers. The feeder will enhance the output of printers in word-processing and DP systems, the firm claimed.

Qume's Speedfeed is an add-on device that inserts fresh paper and removes typed documents while under control of the user's system.

The unit sells for $1,390 and OEM quantity discounts are available from the firm at 2323 Industrial Parkway W., Hayward, Calif. 94545.

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Merged Technologies — Part 3

Use of COM in On-Line System Reduces Cost

By William McCullough
And Frank Malabarba
Special to CW

To address the true cost of an on-line information system, many individual components must be examined and costed out.

In addition, the characteristics of these components adds a degree of difficulty to the costing process: therefore, it is impossible to present a one-line picture of cost.

There are endless varieties of terminals, from Teletypes to intelligent terminals, costing $700 to over $10,000, or $30- to over $300/month. Phone lines costs can be long-distance rates, Wats lines at a flat rate for unlimited usage or dedicated leased lines at the typical rate of .015 cent/day/mile.

Communications controller/processors run from $50 to $30,000/mo or from $2,000 to over $1 million to purchase. Mainframe computers systems capable of on-line operation can cost $2,000- to $50,000/mo to rent or $50,000 to over $30 million to purchase.

Modems, on the other hand, are relatively inexpensive, renting from $8 to $105/mo and costing $135 to $9,000. Operating system and data base management software is supplied free by "unbundled" vendors but others — including independent software houses — charge up to $1,000/mo or up to $69,000 purchase.

Obviously, the cost of servicing even one terminal cannot be derived from figures like these because most components are used to perform a multitude of tasks and because the amount of time they are shared would require microsecond time accounting in order to allocate costs.

Going one step further, the characteristics of the components show there are endless variations in configurations and degrees of sophistication. Most important, however, is the fact that each component in a typical system is dependent upon the other.

This is the last article in a three-part series that looks at the integration of on-line and COM systems. The series was coauthored by Frank Malabarba, a computer specialist for the U.S. Navy at Indian Head, Md., and by William McCullough, national sales manager for U.S. Datacorp, a COM service organization.

If the line is "hit" or a processor goes down, the entire system is affected. The backup components can be added, at extra cost, if priorities dictate, but this simply increases cost a little more.

Although on-line systems are expensive, there are many instances when an on-line system is the only way to go, and even others where almost any cost is justified.

If it is determined that computer output microfilm (COM) can meet the requirements of an information system then the costs, when compared with an on-line system, are much smaller.

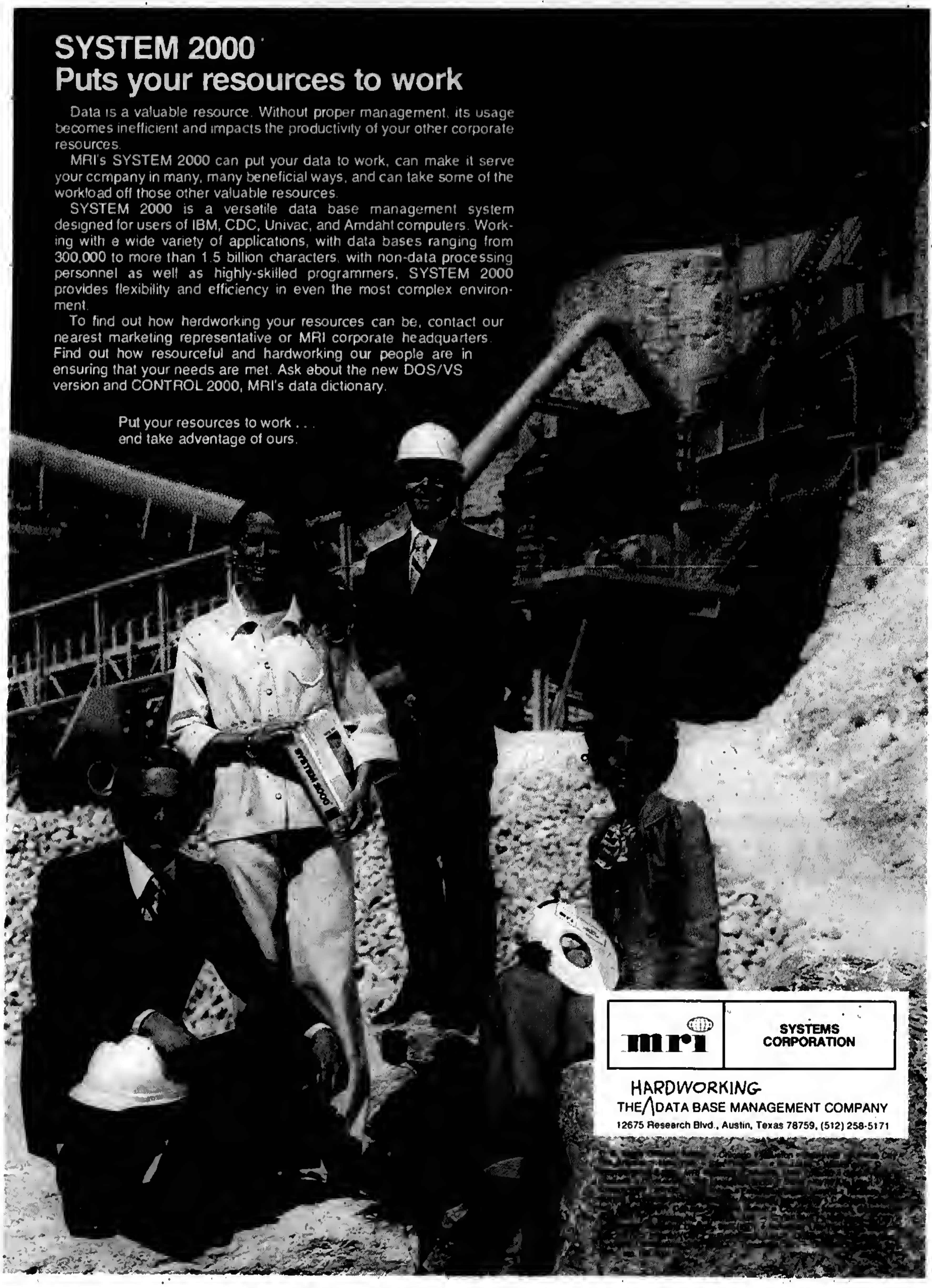
It is difficult to make an accurate comparison between the two media without specific facts, such as the file size, update frequency, number of terminals, etc. A few comparisons that may be meaningful are as follows:

- A COM viewer can be purchased for less than one month's lease of an IBM 3270 terminal.
- A COM recorder can be leased for about the same cost as one IBM 3330 disk drive.
- A 500,000-page data base could be produced on COM and kept current on a daily basis for less than $6,000/mo.

The major area to look for possible savings in system planning is to use COM in conjunction with on-line systems as a replacement for mass storage devices.

Before discussing the topic of real-time/current status, it is important to define these terms. "Real time" is the term used to describe the characteristics of a computer system

(Continued on Page 30)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Free Brochures Available

NEWTON, Mass.— Several firms are offering free brochures and promotional material to *Computerworld* readers.

"A Pocket Guide to Source Data Processing," a 22-page illustrated brochure, is available from Entrex, Inc., 168 Middlesex Tnpk., Burlington, Mass. 01803.

A six-page color brochure on Comtal Corp.'s Vision One image-processing system is available from the firm at 169 No. Halstead St., Pasadena, Calif. 91107.

A 24-page brochure describing electrical connectors and backpanel intraconnection systems is available from Eric Krause at Dynatech Corp., 1225 E. Wakeham Ave., Santa Ana, Calif. 92702.

A 20-page handbook containing conversion tables and engineering data used in process control is available from the Foxboro Co., Dept 120, Foxboro, Mass. 02035.

Analogic Corp. has a six-page brochure on the firm's line of modular power supplies. Users can obtain that brochure by contacting Ray Schafer at the firm on Audobon Road, Wakefield, Mass. 01880.

A brochure describing Caelus flexible disks is available from Electronic Memories and Magnetics Corp., 1020 Timothy Drive, San Jose, Calif. 95133.

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MDS Adds Drum Printer

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has added a 132-column, 900 line/min drum printer for use with its 1200 and 2400 series of data entry/communications systems.

The Model 2442 has a 64-character set with a 96-character set as an option. It has a slewing speed of 30 in./sec and a 20 msec line advance speed.

The printer can accommodate forms with up to six parts; the forms can be from 4- to 16.75-in.-wide, a spokesman noted.

The Model 2442 sells for $30,000 or rents for $930/mo, including maintenance, on a one-year contract, MDS said from 1599 Littleton Road, Parsippany, N.J. 07054.

COM Cuts On-Line User Costs

(Continued from Page 28)

which not only provides on-line access to information, but also allows immediate update and processing of new information. This latter feature is the key to the uniqueness of real-time systems.

When we talk about real time, I think it is safe to say that there are certain functions of an information-processing system that can only be accomplished on-line to a computer.

Now that we have real time in perspective, let's look at the demand for information as it relates to the allowed time to provide that information.

Reservation, banking and inventory system all fall into the 2- to 5 sec response range, and total transaction time may move them into the .1 min range. Even if we go all the way up to the eight-hour point, it is still difficult to produce and distribute any appreciable volume of information within that time, certainly not on paper and in only certain cases via COM.

But let's look at the 80% of information demands that are not needed within eight hours, those that are given overnight or longer. Now we can open the door to COM-produced information which can satisfy most demands.

If we consider that the greater majority of Inquiries into a data base are usually answered using a small portion of the total data available, we can conclude that there is room for improvement in the structure of the on-line data base. Also, considering that some small percentage of inquiries require information from the total data base, what is the best way to improve upon such systems?

If cost is a consideration, then possibly the best way to improve the system would be to purge all data over 24 hours old to a COM file. Using the COM software discussed earlier, the index to the COM file could remain on-line to provide for rapid access to the information in the file. This would not degrade the system in any way.

In addressing the history/-audit trail issue with respect to on-line systems, we have to emphasize the accessibility of information as the key feature. Keeping this in mind, what happens to data that has outlived its useful on-line life and must begin a new life off-line?

In almost every aspect of business today, in one form or another regulations are found that require far more detailed and prolonged recordkeeping than ever before.

When on-line systems design reaches this particular stage, the questions usually faced are: Where do we put this old information and in what format?

The first step is usually to purge the data onto magnetic tape and provide for accessing when the need arises. But let's not forget that "audit trail" is a much more ominous term than "history file." Implicit in the former term is the ability to trace the cumulative results of transactions all the way through a system.

In order to do this on-line, "pointers" are usually provided in the files which send the inquiries either forward or backward through a file to the most current or previous record data. This is necessary because, unlike tape file, disk files are not maintained and updated in the traditional father/son/grandson batch method. So all transactions are usually saved on tape in case files must be reconstructed from some point in time.

Eventually, the string of information which is tied together by pointers grows too long, becomes outdated and is a burden on the data base system itself. It becomes time to purge.

At this point the data can either remain on magnetic tape, be printed out or somehow preserved on microfilm. It is only lately that this latter format has been recognized as the most cost-effective method.

Joining the two technologies together at this point is another of the more versatile examples of the power of COM/micrographics.

If maintenance of an audit trail is a significant requirement of a particular information system, then COM should receive serious consideration.

The COM software to accept computer data, files changes, create indexes and maintain an audit trail on all file activity is readily available from most major COM companies. It is neither difficult to install nor expensive.

In summary, I do not propose COM as a replacement to on-line systems; This isn't possible in most cases. However, if COM is integrated into the planning of information systems, it could result in overall system improvements and, in most cases, a significant reduction in the cost of the system.

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After Univac Takeover

VDM Users Adopt Wait-and-See Stand

By Esther Surden
CW Staff

What happens when a large computer manufacturer takes over the assets of the vendor with whom you've been dealing?

Varian Data Machines (VDM) users seem to be taking a wait-and-see attitude.

Univac concluded an agreement on June 16 under which it purchased the assets of VDM. It recently sent a letter to Varian users notifying them of the takeover.

According to the letter, Univac has employed approximately "1,000 VDM people involved in the development, manufacturing, marketing and services of VDM products on a worldwide basis," and plans to expand this staff. Through its established sales and service network, the firm pledged to "offer expanded services, systems support, parts and maintenance."

Several users surveyed by CW believe things have to get better with the change in vendors. They noted that Varian had recently experienced great personnel turnover and was never very strong on support.

A university user who has had a Varian 620F-100 for a little over four years and is using the system for data acquisition said "I don't imagine [support] will be any worse under Univac." The system is being used in the chemistry department at Memphis State University.

The department had performed its own maintenance and had had very little contact with the Varian people over the years, according to Dr. J.C. Williams, associate professor of chemistry. What little contact there was with Varian was marked by a "big personnel turnover," forcing the department to go through a long list of people in order to contact the right person.

Switch 'No Surprise'

Another user, Dr. Charles Klopfenstein, director of laboratories at Oregon University, said he knew for a long time that the switch from Varian to Univac was in the works so "it wasn't a surprise.

"Things can't be any worse than they were," Klopfenstein said. The laboratories have 18 Varian machines of different models and the university has developed its own hardware and software support capability for the system. "The only time we interacted with Varian was when we called up to order a computer," he noted.

With Univac the supplier, "there is a possibility that this could change," he said.

Another educational user of a single Varian V72 system noted that service and support from the vendor "has got to get better; it can't get any worse. It's been obvious they've been dealing from a situation of crisis for some time."

Because service will be taken care of by the same people who service Univac's systems, responsiveness to complaints and calls for maintenance should improve, according to the user, Dr. Anthony Q. Baxter, assistant professor at the University of Kentucky.

"We have old 620 Ls which are practically obsolete so the switch to Univac has made absolutely no difference to us," according to Robert E. Lee, software specialist for the City of South Bend, Ind.

The city uses the minis as communications front-end interfaces, he noted, and they are "rock solid."

The city has a monthly maintenance contract, Lee said, the system's maintenance is taken care of from the Detroit office. Varian flies in a maintenance engineer and the same person who had been taking care of the minis has continued to do so, he added.

Mini Bits

DEC Drops Prices For Tape Drives

MAYNARD, Mass. — Digital Equipment Corp. reduced prices from 13% to 22% for its TJU45 and TWU45 nine-track magnetic tape subsystems for PDP-11 computers, a spokesman said.

The master tape drive including controller, designated TWU45 for PDP-11/70 computers and TJU45 for other PDP-11s, has been reduced in price from $26,500 to $23,000. Additional drives are available for $14,000.

A two-drive package is also being offered for PDP-11/70 computers, consisting of one TWU45 master drive and one TU45 slave unit. The package is priced at $31,500, a 22% reduction from the previous figure for the same configuration, DEC noted from Maynard, Mass. 01754.

Ampex Add-In Fits Novas

EL SEGUNDO, Calif. — Ampex Corp.'s ARM-3 is a 32K-byte add-in memory said to be transparent and pin-compatible with Data General Corp. Nova 3 minicomputers.

The unit offers 800-nsec full-cycle operation in 16K-word modules.

The 16K module is said to operate in any address field and no modifications are required to either hardware or software to use the unit with the Nova 3. It costs $1,725, Ampex said from 200 N. Nash St., El Segundo, Calif. 90245.

Tester Diagnoses Buses

WOODLAND HILLS, Calif. — A test device designed to tell users of Digital Equipment Corp. PDP-11 minicomputers if they have broken wires in the Unibus is available from Datafusion Corp.

Called the OST11 Bustester, the unit is a portable device for "continuity testing of 72-line Unibus cable," a spokesman noted.

An LED display indicates shortened or intermittent wires.

The OST11 Bustester costs $295 from the company at 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Importer's Mini Tracks Shipments

LOS ANGELES — When one small business system couldn't fill its needs, Laube Corp. turned to another with much success, according to Walter Ising, president of the firm.

The company, a world-wid importer and distributor of steel products and electronic components, used to keep track of shipments throughout the world on an enormous blackboard spanning an entire office wall.

The names of the ships carrying the cargo, identification numbers and logs of merchandise were updated on the board by three employees.

The firm began to computerize with a Singer Business Machines System 10 small business system which, Ising said, "never functioned." When Singer went out of business "we were lucky because we hadn't paid them anything."

The firm then decided to try a different approach. It looked into several systems and decided that one from General Automation was "compact enough and simple enough" to use in its operation.

The firm contracted with California Data Management, Inc. (Cal Data) to design and implement an in-transit inventory tracking, order entry, purchasing and accounting system. Cal Data was chosen because it was located in the same building as Laube and could write a special program designed for the firm's needs. "It was very familiar with our type of business," Ising added.

The General Automation DM 130/2 data management inventory/accounting system used at Laube includes the GA SPC-16 mini with 32K words of memory, 10M bytes of disk, a 165 char./-sec printer and two CRT terminals. Although most of the programs are up and running on the system, some still must be modified or corrected.

A minor change is being made in the critical tracking application to allow it to accommodate more than one shipment per order. That application should be running shortly, he noted.

"We used large portions of standard General Automation packaged software and modified it to fit Laube's application," Cal Data president Malcolm Sherman said.

"The system had to take several variables into consideration. Laube wanted to eliminate manual errors, retrieve inventory information, establish an order tracking system and provide service to customers regarding the status of their orders," Sherman explained.

Because much of Laube's business is conducted with Japan, the system had to handle both dollars and yen and had to deal with English and metric measure-

(Continued on Page 32)

1.8M Bytes of Memory Available on HP 21MX

CUPERTINO, Calif. — Hewlett-Packard has increased the amount of memory that can be used with its 21MX and HP 1000 series systems to 1.8M bytes.

The expansion has been made possible through the introduction of a high-density memory module containing 128K bytes of semiconductor fault-control memory and the addition of an optional memory extender.

The memory module uses 16K-bit n-channel random-access memory chips, HP said.

The increased memory allows the system to be used in applications in which high speed and maximum throughput are important and a disk memory is not suitable, the firm explained.

The memory module with fault control can be used by any HP 21MX system in the K, M or E series and any 21MX with a dynamic mapping system can be filed-upgraded without changes to existing software, HP noted.

The 128K-byte memory costs $6,400; the fault-control memory controller costs $600 and associated check bit boards cost $2,750 for blocks of memory up to 256K bytes or $5,000 for blocks of memory up to 512K bytes.

A 12-1/4-in. high E-series with 1M bytes of the high-density fault-control memory costs $59,800; with an extender including 768K bytes the system has a total of 1.8M bytes of memory and costs $109,450. HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Small Businesses Advised to Use DP Resources

FORT LAUDERDALE, Fla. — Small businessmen who avoid using modern technology may face rough roads ahead, B. Joseph Vincent, managing director of Oz International, said here recently.

Sharper competition coupled with increased operating expenses and tighter profit margins are having a stronger effect on the profitability of small businesses today, Vincent said.

Believing small businessmen should begin to take advantage of the benefits modern technology can provide to improve operation, Vincent acknowledged that in the past many small businesses did not take advantage of those benefits for a very important reason — cost.

However, the increased importance of opportunity costs, cash flow and inventory control on the overall profitability of small businesses have served to reduce the costs of computer-type technology.

"Properly utilized, this technology can help reduce overall operating costs and increase profit margins," Vincent said, "by allowing the entrepreneur to make decisions based on more reliable information.

"A prime example of the need for more accurate inventory control is the restaurant business.

"For example, if a restaurant orders 10 cases of lettuce on Monday for a featured salad bar week and the customers choose different menu selections during the first part of the week, the lettuce goes bad, money is lost and profit margins get slimmer.

"If the manager had an up-to-date information system to use in deciding his ordering schedule, rather than seat-of-the-pants reckoning, much of the waste could have been avoided."

If a businessman can't afford his own computer, he may be able to share a computer someone else is using already. There are companies that specialize in selling and maintaining time-sharing programs.

"Another possibility is the commercial banks that handle their daily banking business.

"If this isn't possible, businessmen could try schools that offer computer courses like universities and technical facilities. Often, they will let you rent time from them and provide expert help in designing programs and solving problems," he noted.

Mini Tracks Shipments

(Continued from Page 31)

ments. Also, the system had a number of logical devices installed to check errors.

"Basically, the most important function of the computer is to provide all order information at the tip of our fingers and give us the status of orders we have placed for our customers at any time," Ising said.

There is usually a long lead time, sometimes five months or longer, from the time of purchase to the time the merchandise is received. The system keeps track of the cargo as it progresses on its journey to the buyer in terms of the buyer's order to Laube and Laube's order to its suppliers.

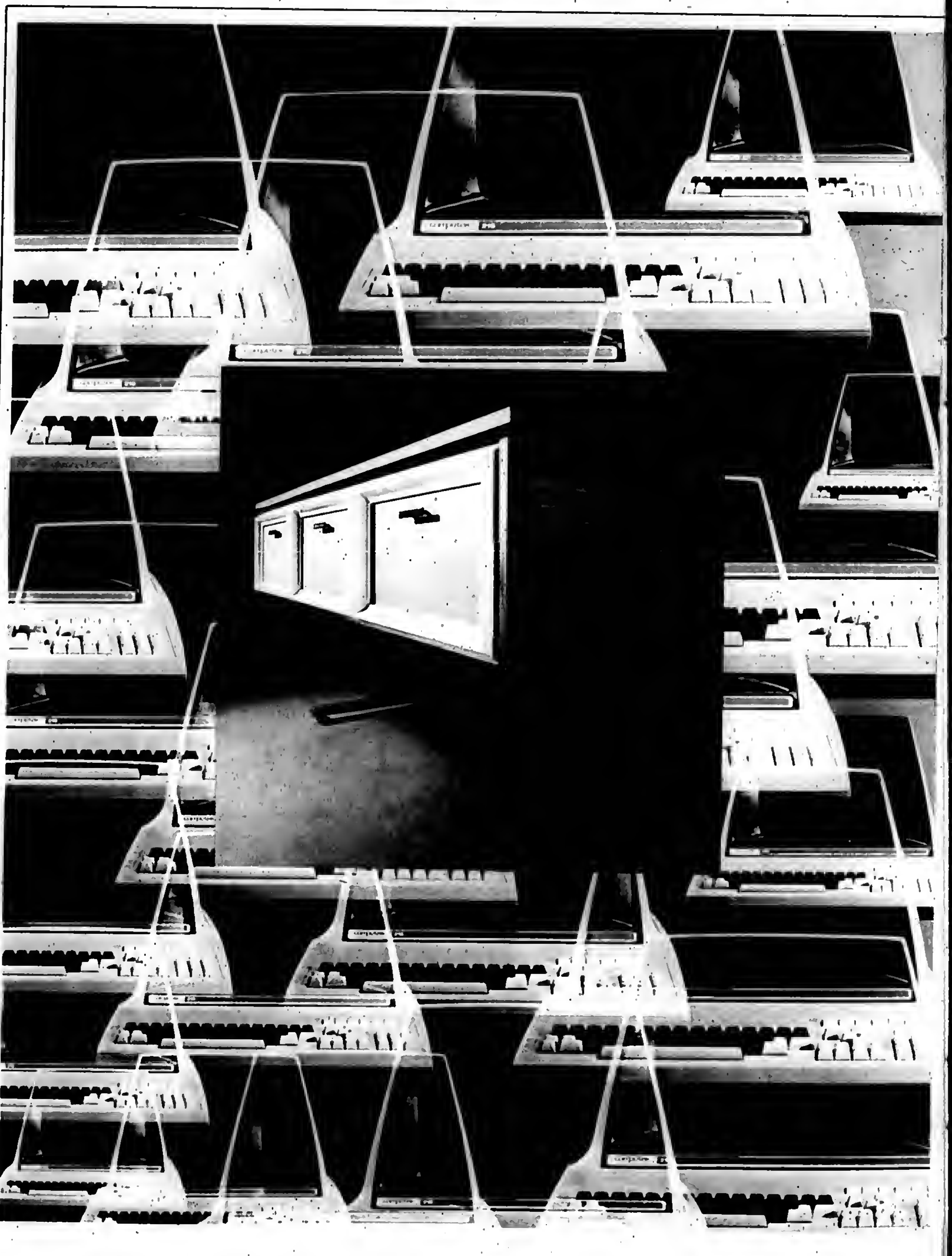
Supervisory Computer

The majority of activity at Laube is generated from its Los Angeles office. From this location, manufacturing representative needs, ordering, distribution and inventory control are controlled by a mainframe supervisory computer.

In addition, the system here handles accounts payable, general ledger and accounts receivable. The sales department accesses the computer daily to retrieve any sales information.

One operator and two trained backup operators work on the system, Ising noted. Maintenance is handled through a General Automation service contract and has been very good, he added, with the firm never having to wait more than two hours for service.

"I would like to see more business from the system," Ising said. "It has the potential of producing more business by reducing possible cancellations and keeping better track of orders," he explained.



Manual Invoicing 'Too Error-Prone'

Mini Helps Firm Tackle Growing Client Base

MEMPHIS, Tenn. — The installation of a small business system has helped Steelcraft Corp. here cope with a swelling customer base and the resulting paperwork blizzard, according to assistant treasurer D.A. Drewes.

The company manufactures pneumatic dust-handling systems for the woodworking, grain and paper industries and also produces motor bases and angle rings.

"As the customer base grew to well over 1,000, paperwork also grew. With assorted price lists, the hand invoicing became too error-prone and the hand posting too laborious to tolerate," he explained.

To remedy the situation, the Wang Laboratories, Inc. 2200 minicomputer was selected in May of 1974 and program installation began that August.

Since acquisition of the minicomputer, the firm has installed a receivable, payable and payroll system, which includes product line and salesmen's sales analyses as side benefits of the invoicing programs.

In addition, the invoice files are scanned for specific product sales to provide production control and, together with the necessary sales data, reports are produced that forecast future needs. From the master customer files also come monthly statements and collection letters.

After the basic systems were operational, the company added several applications. Initial applications were programmed by the software dealer, but Drewes did the rest himself.

Asset and depreciation listings were computerized and annual depreciation charges were calculated. This eliminated burdensome lap schedules. In addition, shop equipment maintenance records were stored on disk and maintenance requests were automatically generated at the proper intervals.

Mailing list programs were also written which could access either the customer master file or purchased lists and then output the proper letter. Price and weight sheets of various standard manufactured items were kept up-to-date and provided to sales personnel as required. Time cards were printed from payroll records, along with lists by seniority and birthdate as well as lists required for various pension and profit-sharing plans. The firm also designed programs which provide sales and sales tax by state for required government tax reports.

Currently two systems to aid the manufacturing division are under development. The first is for use with recently purchased numerically controlled punch and cutting equipment. The program generates the necessary coordinates to cut flat patterns for elbow gores.

This is a mathematical program utilizing trigonometric functions and layout procedures developed over the years for sheet metal products.

Order Control Program

The other system under way will aid in order control, production and erection scheduling. The first portion consists of a field erection schedule, which divides the job into various systems required and traces the progress from original scheduled performance through actual costs of erection. It also tracks the ahead or behind condition through field analyses of percentages of completion.

If more than one system is tied together for erection purposes, the schedule will adjust to this situation as progress is charted. The total schedule will provide quick data on whether the target completion will be met or will indicate that steps must be taken to correct the situation.

The program involved will handle any job with 40 or fewer divisions. Actually, the number 40 is controlled by the 132-column print capability of the high-speed printer, since each division requires three columns plus room on the left of the form for date information.

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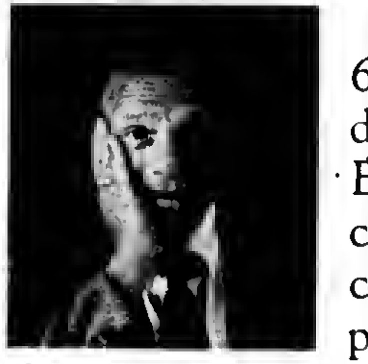
*(Published quote of an independent computer expert. Name on request.)

THE DATAPOINT 6600--

Datapoint 6600 Computer with 20-megabyte disk drive

For Network Planners It's a Disturbing System



"The Datapoint 6600 is indeed a disturbing system. Because it will change the way computer network planners now think about "small" computer systems.

True, the 6600 is small physically, like the Datapoint computers that have come before it. But it is equipped with the latest technology, including features like 120K user memory, and can support up to 24 independently-functioning video display terminals in a true timesharing mode. In fact, the Datapoint 6600 packs the processing wallop of many of today's large-scale computers, at a fraction of their cost.

When combined with Datapoint's wide range of peripheral equipment, such as the new 20-megabyte disk drive, the 6600 can be used to produce a variety of disturbingly capable systems. It will free network designers from many of the constraints that previously bound them. With the 6600, regional centers can remove a major processing burden from the central mainframe computer while boosting the efficiency of local operations. In fact, a well-planned dispersed processing network can in many cases eliminate "mainframe inflation" altogether.

Like other Datapoint dispersed processors, the 6600 functions well in a stand-alone mode. It has the speed and power to handle 24 different user programs simultaneously, or to run batch jobs in COBOL, BASIC and RPG II. And with communications capabilities always available, a stand-alone 6600 can be converted almost instantly into a functioning node in a dispersed processing network.

In truth, the 6600 is a disturbing system because it will challenge your present assumptions about what a small computer can do for your operation.

Accept the challenge. Study the Datapoint 6600 in detail. Compare it with the competition. Look at the carefully planned sequence of compatible Datapoint hardware and software products which have preceded it. We think you'll come to the conclusion that the 6600 has more to offer than any comparable system now on the market.

For more information on the 6600, contact the Datapoint sales office nearest you, or write Datapoint Corporation, attention: Product Marketing, 9725 Datapoint Drive, San Antonio, Texas 78284
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Micro Bytes

Real-Time Warfare Game In 8080 Assembly Code

TALLAHASSEE, Fla. — Objective Design, Inc. has a real-time warfare game written in 8080 Assembly language.

"Encounter" allows each player to attack and defend as many places on the field as the player is able to mentally maintain. The play is continuous, according to a spokesman.

Hardware requirements include an 8080 or Z80 processor, 4K bytes of random-access memory, two interfaced Ascii keyboards and a CRT terminal.

With complete rules and source code, the game costs $16.95 on paper tape and $19.95 on tarbell tape from the firm at P.O. Box 20315, Tallahassee, Fla. 32304.

Mikados Gets Disassembler

VAN NUYS, Calif. — Inpro Micro Systems has enhanced its Mini Instant Keyboard Assembler, Debug and Operating System (Mikados) to include a complete disassembler.

With the enhancement, Mikados occupies 3K bytes of memory. The $17.95 price includes a 28-page user's manual and hex object code listings plus a limited 90-day warranty.

California residents must add 6% sales tax, the firm noted. It can be reached through P.O. Box 7776, Van Nuys, Calif. 91409.

Booklet Explains Buzzwords

TEMPE, Ariz. — Byte Shops of Arizona has a catalog of microcomputer systems, peripherals and lexicon.

The "Byte Shopper" serves as an introductory text to personal computing, providing explanations of buzzwords and descriptions of how microcomputers work and where they can be useful.

The guide integrates manufacturer's specifications with a discussion of how each product can be used and how it relates to an overall computing system. Typical systems are pictured and discussed in detail.

"Byte Shopper" is available for $2 from P.O. Box 28106, Tempe, Ariz. 85282.

German Hobbyists Share Notes

KELKHEIM/TAUNUS, W. Germany — A German computer hobby club has been started under the auspices of CMIX GmbH, which is making available components for assembly of a CMIX 8080 minicomputer.

The club is willing to give others advice on how to start a similar venture.

Further information is available from Martin Jetter, Mozartstrasse 13, D6233 Kelkheim/Taunus, W. Germany.

Kim-1 Housing Offered

SAN FRANCISCO — The Enclosures Group here has developed a housing for the Kim-1 microcomputer.

The housing is manufactured from high-impact thermoformed plastic and is available in a variety of colors.

It costs $23.50 from the firm at 55 Stevenson St., San Francisco, Calif. 94105.

Altair 8800 Gets Power

ALBANY, Calif.— Parasitic Engineering has a constant voltage power supply designed for Altair 8800 microcomputers.

The unit can replace the three standard 8800 transformers, according to a spokesman.

The power supply kit costs $90 postpaid from Parasitic at P.O. Box 6314, Albany, Calif. 94706.

Micros Can Be Defined By Genesis, Orientation

By Dr. Adam Osborne
Special to CW

Microprocessors are likely to have a larger impact on DP then many people realize. Today's popular microprocessors all have DP origins.

It is not well-known, but the Datapoint 2200 CPU is the grandfather of today's microprocessors. The 2200's instruction set is equivalent to a very primitive microprocessor, the Intel 8008; however, the 2200 executes instructions 10 times faster than the 8008.

Since Datapoint CPUs have made great inroads into DP applications, this should be enough of an indicator for future microcomputer possibilities.

Fit Two Categories

We can divide microprocessors broadly into those which are ancestors of the Datapoint 2200 — and are well-suited to DP applications — and those which have been designed specifically for digital logic applications. The principal differences between these two sets of microprocessors may be summarized as follows:

- Instruction sets of the DP-oriented microcomputers are adequate for DP applications. Digital logic-oriented microprocessors, on the other hand, tend to have very primitive instruction sets with many key capabilities absent.
- DP-oriented micro can easily be expanded with various support devices to handle peripheral devices such as CRTs, disk units and printers. Digital logic-oriented micros have I/O capabilities that are better suited to creating and processing logic signals.

Microcomputers that can be classified as DP-oriented include the Intel 8080A, the Zilog Z80, the Motorola MC6800, the MOS Technology MCS6500, the Signetics 2650, the Texas Instruments TMS9900 and the Fairchild 9440. These are all 8-bit microprocessors with the exception of the TMS9900 and the Fairchild 9440, which are 16-bit microprocessors.

The Fairchild 9440 has an instruction set which is identical to the Data General Nova 1200 minicomputer. The Intel 8080A, the Zilog Z80, the Motorola MC6800 and the MOS Technology MCS6500 are all descendents of the Datapoint 2200.

The Digital Equipment Corp. PDP-8/E minicomputer is also available as a single chip microprocessor — the Intersil IM6100.

Digital logic-oriented microprocessors include the Fairchild F8, the RCA Cosmac, the Intel 8048, the National Semiconductor SC/MP, the Scientific Microsystems SMS300 and the Texas Instruments TMS1000.

The Intel 8085 is an enhancement of the 8080A, aimed at making the microprocessor suitable for digital logic applications as well as DP applications. The Zilog Z80 is also an enhancement of the 8080A, but the enhancements were aimed almost exclusively at making the microprocessor more attractive in DP applications.

The principal difference between DP-oriented microprocessors and digital logic-oriented microprocessors lies in the design of the large-scale integration (LSI) devices that constitute the microprocessors. DP-oriented units use a considerable amount of logic to implement a realistic instruction set; they pay the price of requiring many additional support devices before a usable microcomputer is obtained.

Digital logic-oriented devices, on the other

(Continued on Page 38)

Set for Aug. 27-28

Atlantic City to Be Scene of Fair

By Frank Vaughan
CW Staff

ATLANTIC CITY — The Personal Computing '77 (PC '77) Consumer Trade will kick off here Aug. 27 following a week of preconvention activities.

Dr. and Mrs. John Mauchley, both of whom worked on Eniac, the first electronic digital computer, will be featured guests and speakers at the two-day fair.

Over 100 exhibitors are expected to attend the show, according to John H. Dilks, PC '77 director. Heath Co. has chosen the trade fair to make the first public exhibition of its line of computer kits, he noted.

In addition, Cromemco will announce its floppy disk sytsem and RCA will introduce a programmable video graphics machine and its own interpretive language geared toward graphic displays, he said.

Part of this year's PC '77 will include free seminars, forums and technical talks. Subjects will include Eniac, telecommunications, microprocessor design, robots, interfacing, the human factor, music, the handicapped, applications and debugging, Dilks said.

A Personal Computing College consisting of four groupings will be held during the week preceding PC '77.

Dr. Adam Osborne of Osborne and Associates, Inc. will present "Microprocessors — Where They Came From and Where They Are Going," an analysis of products on the market today.

The Aug. 26 and 27 seminar will last six hours and cover a variety of subjects. Information and reservations are available through Osborne and Associates, Dept. PC '77, P.O. Box 2036, Berkeley, Calif. 94702. The telephone number is (415) 548-2805.

Tychon, Inc. will present a three-day "Microcomputer Interfacing Workshop" to provide hands-on interface experience for participants. Reservations can be made with the firm at Dept. PC '77, P.O. Box 2203, S. Hackensack, N.J. 07606.

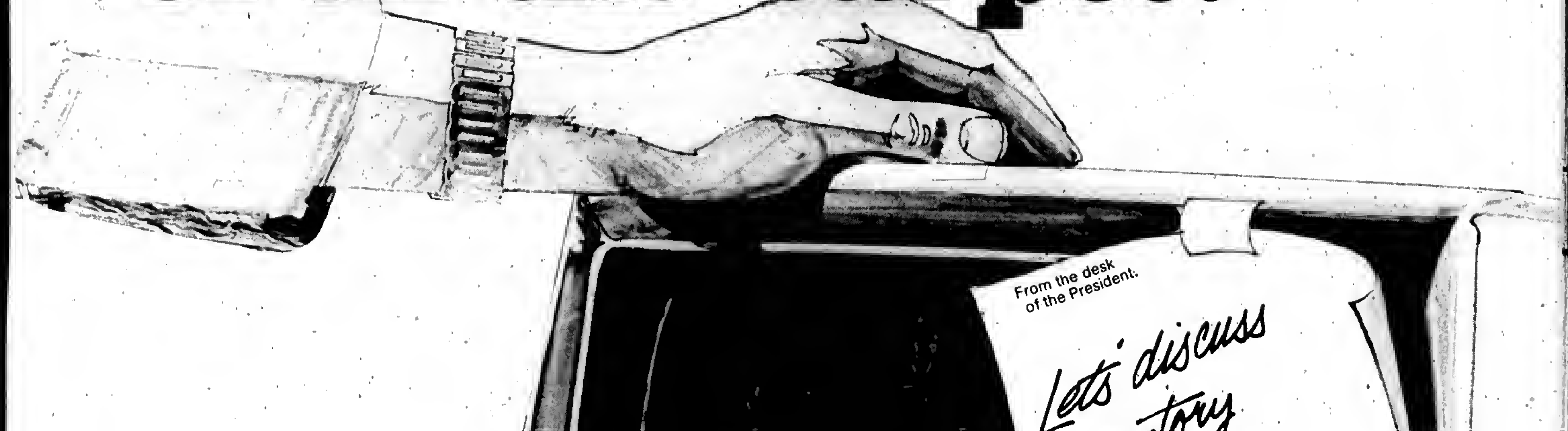
Sybex, Inc. will present "An Introduction to Microprocessors" on Aug. 25 and 28. It will include information on basic definitions, system components, what to look for, impact and evaluation.

On Aug. 26, the firm will present "Microprocessor Applications," which will detail the main application techniques of microprocessors. Information and reservations can be obtained from the firm at 2161 Shattuck Ave., Berkeley, Calif. 90704. The telephone number is (415) 848-8233.

Technical Design Labs and Trenton State College will combine forces to produce a series of Z80 seminars. The Aug. 22-26 seminars will cover programming in Basic, Assembly language programming, Fortran IV, word processing, introduction to hobby computing, digital logic circuits, how to set up a computer store and a kit building lab. Information and reservations are available from Z-80 Seminars, Trenton State College, Trenton, N.J.

Additional PC '77 information is available by contacting the show at Rt. 1, Box 242, Mays Landing, N.J. 08330.

To the VP of manufacturing who'd rather be on-line instead of on-the-carpet:


From the desk
of the President.
Let's discuss
inventory
variances
Tomorrow
8:30 AM
K.F.

An on-line inventory management system is a nice thing to have when you need answers in a hurry. Especially if the system gives you the controls you need to make sure the answers are not full of surprises.

To our V.P. of manufacturing, such a system is more than a nice idea; it's absolutely essential. By being on-line to an interactive, multiuser Prime computer programmed to handle Prime's specific needs, he has everything under control. Last year, for example, the system helped his organization control the variance between physical and book-value inventory to less than 0.1%!

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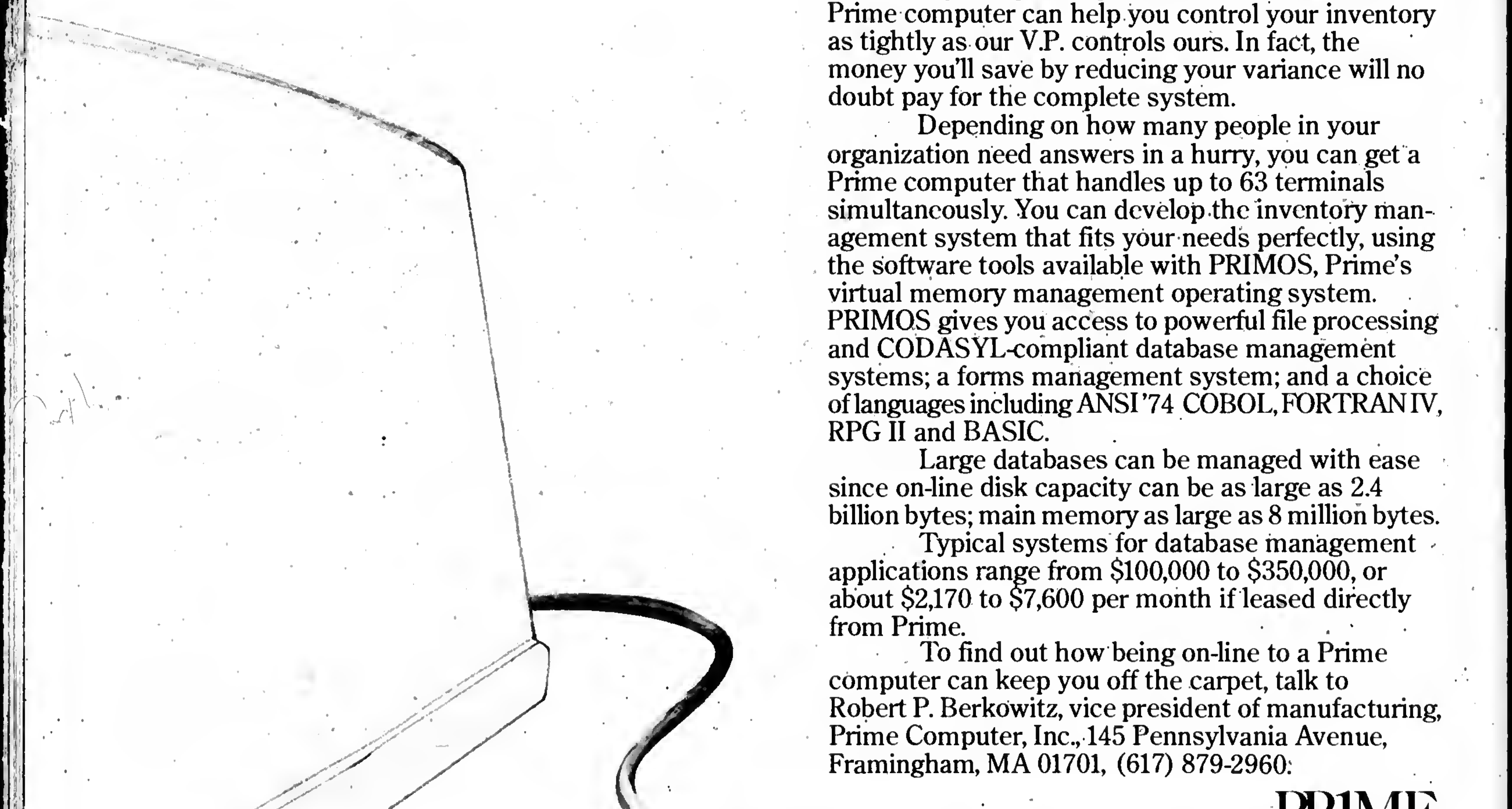
Large databases can be managed with ease since on-line disk capacity can be as large as 2.4 billion bytes; main memory as large as 8 million bytes.

Typical systems for database management applications range from $100,000 to $350,000, or about $2,170 to $7,600 per month if leased directly from Prime.

To find out how being on-line to a Prime computer can keep you off the carpet, talk to Robert P. Berkowitz, vice president of manufacturing, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701, (617) 879-2960.

PRIME



Prime can help

Datapoint 2200 'Grandfather' of Microcomputers

(Continued from Page 35)

hand, generate whatever instruction set they can from a very limited amount of logic; if they want to keep down part counts to satisfy the economics of very high volume consumers (such as television manufacturers).

Obvious Differences

An Assembly language programmer with minicomputer experience, when encountering a DP-oriented microcomputer, will find suprisingly few differences between the products as far as instruction sets are concerned. The most noticeable difference will be word length — commonly 8 bits for microprocessors and 16 bits for minicomputers.

Other noticeable differences are:

- Microprocessor instruction sets are almost uniformly well-suited to pure procedure programming; that is to say, these instruction sets naturally lend themselves to separate program and data memory areas, where the program memory will never be changed during the course of a program's execution and can therefore be defined permanently in read-only memory.
- Microprocessor instruction sets have relatively limited memory reference capabilities. Indirect and indexed addressing is rare, while even direct memory addressing is not always available.

Implied memory addressing is the principal method used by microprocessors; this involves maintaining memory addresses in memory address registers, then having memory reference instructions simply identify the memory address register where the memory address is to be found.

Surprisingly, DP-oriented microprocessors make very effective use of memory. For example, the Intel 8080A and the DEC LSI-11 will usually generate object programs requiring approximately the same total number of program bytes. The 8080A source program, however, will have two to three times as many Assembly language instructions create 1 byte of object code, while none create more than 3 bytes of object code.

This makes Assembly language programming far more tedious, and therefore expensive, when using a microprocessor; however, higher level languages are rapidly becoming available on the more popular microprocessors.

Today Basic is the most commonly used higher level language while PLM (a subset of PL/I) is in relatively common use. Fortran is just beginning to appear.

Microcomputer systems based upon DP-oriented microprocessors typically offer CRTs and keyboards, floppy disk units, cassette units and matrix or daisy wheel types of printers.

Fixed-disk units are not generally used since their data storage capacity and data transfer rates simply overwhelm the average microprocessor.

Similarly, very high-speed printers offer more capacity than a flopy disk-based system can utilize. Thus a typical microcomputer system will have these components:

- A microprocessor unit (MPU).
- Between 8K and 32K bytes of memory (64K bytes is the usual maximum).
- One CRT terminal.
- Floppy disks with a data storage capacity ranging between 250,000 bytes and 1 million bytes.
- A matrix or serial printer with print speeds ranging between 40 char./sec and 300 line/min.

This is a respectable computer system which a small company can use for its data processing. Such a system will cost approximately $10,000.

Speculating Ahead

It is interesting to speculate on the future.

Already it is possible to buy the Nova CPU or the PDP-8 CPU on a single chip. The PDP-8, by today's standard, is a relatively inefficient microprocessor.

The advances we are seeing in LSI technology make it probable that by 1985 single-chip CPUs selling for less than $100 will offer capabilities that rival mainframe computers available today. It is not unrealistic to expect CPUs with the performance of an IBM 360/40 to be available by 1985 and selling for less than $100.

It is already possible to buy 16K of read/write memory for less than $500. By 1985 it should be possible to buy 64K bytes of read/write memory for less than $200.

Thus hardware costs will continue their incredible downward spiral while performance will penetrate well into the area of 1977 mainframe computers.

It is hard to visualize what the impact of this technology will be on the DP industry in general. Certainly companies with a massive investment in application software are not interested in minor hardware savings that may accrue from inexpensive microcomputer-based systems. Also, until massive breakthroughs are made in reducing programming costs, reductions in computer hardware costs may represent too small a portion of the total installation expense to be significant.

Breakthroughs in programming costs are being made. Logical Machine Corp. has the Adam computer, which may make this breakthrough. This is a computer that can be programmed in English, with a user-created vocabulary. While Adam has not eliminated programming languages, it has gone a long way in this direction.

Logical Machine will probably be one of the principal beneficiaries of new, more powerful and less expensive microelectronics, since this will allow the "programless computer" concept to be taken from its present relatively primitive dimensions to computer systems that are really programmable by accounting professionals and nonprogramming personnel.

Osborne is president of Osborne and Associates, Inc. of California.

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CI Notes

Calcomp Workers On Shorter Week

ANAHEIM, Calif. — California Computer Products, Inc. has shortened its work week to a four-day, 36-hour week "to increase productivity, raise employee morale and reduce costs."

Under the plan, which became effective Aug. 1, the company switched to a four-day week, and lengthened the former eight-hour day by one hour. The employees' contribution to the plan is a reduction of 5% in their gross income, providing the company with an important cost saving, according to Calcomp.

The plan will also result in savings from reduced expenses for plant security, electrical energy consumption and maintenance.

The "4-36 Plan," as it has been dubbed, affects some 1,700 employees. Field sales and service personnel were not affected.

IEEE Members Form Good Government Group

NEW YORK — Members of the Institute of Electrical and Electronics Engineers (IEEE) have announced the formation of the IEEE Good Government Group (GGG).

The activities of the IEEE/GGG will be aimed at strengthening the leadership of the IEEE by identifying, endorsing and actively supporting the best available candidates for president, vice-president and directors, according to Dr. F. Karl Willenbrock, secretary of the IEEE/-GGG steering committee.

Candidates for IEEE offices who are interested in a possible endorsement by the IEEE/GGG should contact Willenbrock at the School of Engineering and Applied Science, Southern Methodist Univeristy, Dallas, Texas 75275.

The New PCMs — Part 1

IBM-Type CPUs Increasing

By Toni Wiseman
CW Staff

The ranks of plug-compatible mainframe manufacturers are steadily swelling as more and more vendors enter what some have called "anyone's horse race."

Is this the way of the future? How far will IBM allow these plug-compatible manufacturers (PCM) to go?

Will Brand X machines appear? How will new technology affect PCMs?

These are all questions being whispered in DP shops, but industry observers don't agree on all the answers.

IBM-compatible mainframes certainly form an attractive and viable marketplace, and most agree the industry can expect to see more firms joining the ranks of Amdahl Corp., Control Data Corp. and Itel Corp. The most likely candidates are the Japanese, some feel, but another U.S. competitor may still register his colors.

"I don't think the companies are looking at the giant with the idea to stab IBM. They're simply accepting it as a market force, as a mountain sitting there and so — mine the mountain," Art Yerkes, Datapro Research Corp.'s mainframe editor, said.

"IBM is so big and its installed base is so big that there's enough throw-off on this thing that it creates a new type of product — the plug compatible," Yerkes believes.

"It wouldn't be reasonable at this point for anyone to make a Honeywell- or Burroughs-compatible machine because they're not as big as IBM, which probably has about 80% of the market. But if, hypothetically, someone got lucky and came up with a system that erodes half of IBM's market so each has 40%, the remaining six dwarves et al still have only 20% divided among them.

"But now there would be two huge markets to attack with plug-compatible machines," he said.

It's clear that PCMs are having a very powerful effect on IBM because the corporation is obviously doing a variety of things to react — the 3033 for instance, Elinor Gebremedhin, project editor at Auerbach Publications, noted.

This is the first article in a three-part series that looks at the fast-developing plug-compatible mainframe scene and its various players, including IBM.

Part 2 will examine marketing strategies, counterstrategies and new technologies from the viewpoint of industry observers; Part 3 will consider the phenomenon from the viewpoint of the investment community.

"All you have to do is look at Amdahl deliveries and the fact that it got profitable so quickly" to realize the attraction of the market, she said.

A host of plug-compatible machines on the market will not take competition away, however, Gebremedhin suggested, since the machine is only a very small part of the situation. "It's the software background, the expertise of the manufacturer and the services it can deliver that are the more important part. The biggies are the system manufacturers, not the machine manufacturers," she said.

Important Edges

Nevertheless, PCMs do have some important advantages at the moment, according to Frederic G. Withington, senior staff member at Arthur D. Little, Inc.

"Without having specific delivery dates, people know the 3033 is a long way off and some of them are interested in a shorter term delivery. Also, Amdahl offers the 470V/5, which is under the 3033, and IBM hasn't announced a comparable product," Withington said.

"This all means that Amdahl and the others are in pretty good shape now, but of course this is a temporary condition," he warned. "The time will come when the new IBM processors are equally available and then that particular advantage for the PCMs will disappear."

The industry observers all agreed that plug-compatible products are probably not going to be the only form of competition. In fact, plug-compatible main-

(Continued on Page 42)

Nixdorf 8820 Reappears

CHICAGO — If you thought you saw a new intelligent terminal froim Nixdorf Computer, Inc. at Interface '77 last March in Atlanta, but wondered what happened to it, you can stop wondering.

The intelligent terminal system called the 8820 was shelved when Nixdorf acquired Entrex Corp. of Burlington, Mass., because its features could be incorporated more appropriately into the Entrex product line, according to a Nixdorf spokesman.

The 8820 can operate as a stand-alone terminal system or on-line with a host CPU and includes remote and real-time processing features and multiple disk storage. Its features will probably surface in a future Entrex product, the spokesman stated.

Nixdorf expects the acquisition of Entrex to double the size and capabilities of the German-based firm in this country, he said.

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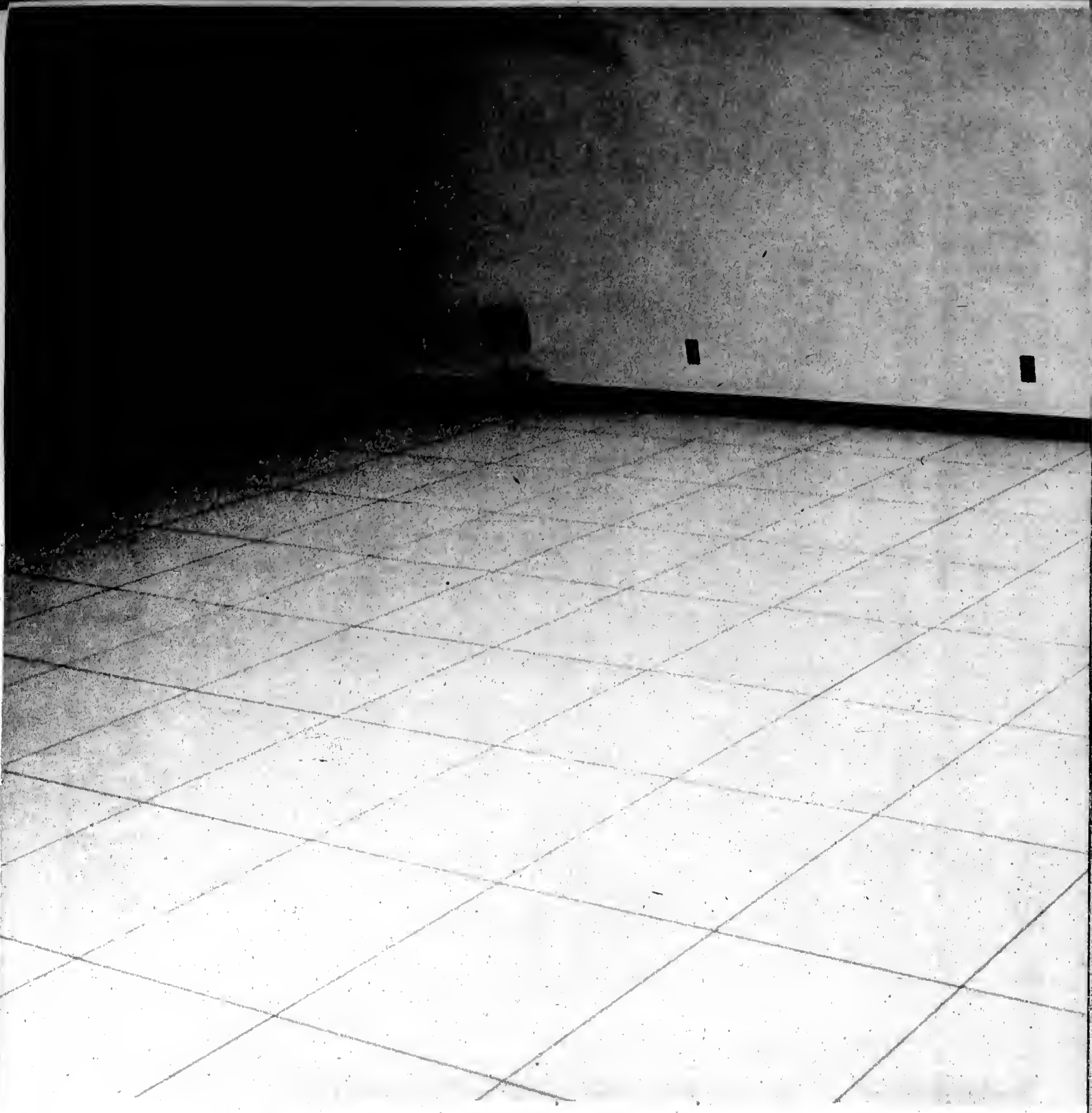

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Firms With Plug-Compatible CPUs Increasing

(Continued from Page 39)

frames are probably not even a good idea for some manufacturers.

Withington, for example, said he "feels strongly that the organization providing the operating system and the most compex systems programs in general is the piper which calls the tune to which the others must dance."

This means there are really only four organizations — IBM, Honeywell, Burroughs and Univac — which are in a position of leading the general systems parade, he said.

"This does not preclude, however, the PCM people from being so quick and capable that they can keep up with anything that's done by the systems programs people and at this point I'd call it a horse race."

Are plug-compatible machines going to be the "in" way to compete? Auerbach's Gebremedhin believes that while PCM systems are definitely an important market factor, they are not going to wipe out other types of competition.

"IBM has an important part of the market, but other mainframers are certainly going to hang on to what they have and develop their strong points," such as Burroughs' position in the financial and banking industry, NCR's in the retailing area and CDC's in the scientific arena, she said.

'Big Six' Entry Doubtful

While some of those interviewed said other mainframers could enter the plug-compatible mainframe arena, some doubted whether others of the "Big Six" would enter because to do so would, to a certain extent, undermine their own offerings.

Gebremedhin suggested that CDC is the only logical contender since it has been in the plug-compatible business for a long time and has been very successful with plug-compatible peripherals where other manufacturers have not.

In addition, CDC is not in the same position as some of the others, she pointed out, since it has largely concentrated on scientific systems in the past. It would therefore seem logical for CDC to enter the business end of the market with a plug-compatible machine.

Not Sensible

But, she added, it would not make sense for Burroughs, for instance, to offer an IBM-compatible machine which would compete with its check-processing systems.

Withington, on the other hand, said he could not see any reason why another mainframer could not build and market an IBM-compatible machine — and why that mainframer's base could not be a target for IBM or others.

He also proposed the possibility of a large mainframe corporation offering two entirely different large processors in the same price range — one with XYZ software and one with IBM software. While these two machines might compete internally in maybe 5% of the cases, it is rare for large users to switch from one operating system to another.

Japanese Expected

James Peacock, vice-president of International Data Corp., agreed it is reasonable to expect some new competition in the PCM market, but he expects the newcomers to be Japanese.

He pointed to the fact that Amdahl is working with Fujitsu and Itel has recently joined with Hitachi. Both Japanese firms already produce systems which are nearly IBM plug-compatible.

Gebremedhin observed that the Japanese have a problem in that they don't have either a software build-up or a marketing organization in this country. Therefore, it's entirely logical for them to team up with an American manufacturer that lacks the mainframe capability but has a large sales and marketing organization.

be the next firm to enter the market. "However, its expertise is more with a Honeywell-type system, so it may not go forward into the IBM market."

Counterstrategies are expected from all sides. Next week: What will these counterstrategies be, and how far will they go?

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Telefile Helping Xerox Systems Users Continue

By Toni Wiseman
CW Staff

IRVINE, Calif.— In the past year and a half since Xerox Data Systems (XDS) withdrew from the mainframe business, Telefile Computer Products, Inc. has made it its business to supply the needs of XDS systems users.

Not content with simply offering new peripherals, Telefile is developing two new Sigma mainframes for delivery in 1978. These include a microprogrammed Sigma 9 and a Sigma 11, designed to be four times faster than the present Sigma 9 at about half the price.

Telefile's strategy is to replace only the computing engine at first, and then gradually update the I/O and memory, to avoid a total replacement at once, according to president Sam V. Edens.

In addition to the CPUs, Telefile offers a wide range of hardware-compatible, software-transparent products including dual-density disk systems, printers, card readers, concentrators, main memory and mass storage facilities with up to 2.3 billion bytes per system.

A 317M-byte Winchester-type system with fixed-head option will also be available by the end of this year, Edens said.

Best Operating System

Telefile's whole philosphy is based on the concept that it is easier to take someone else's $100 million investment in software, such as Xerox's, and put another machine under it, than to develop new software, Edens indicated. And, he said, everyone from the users to Datapro agree that the Xerox operating system is the best available.

Amdahl has built a machine to run IBM software, so in some aspects Telefile and Amdahl are in the same business, Edens said. "But in our case, we have a lot more going for us because IBM's software is constantly changing, whereas there is no one left at Xerox's helm to make changes, so we are dealing with a known quantity. We don't need a crystal ball," he noted.

Honeywell's goal is to convert Xerox users to their Level 66, but that is a fairly large machine. Sigma 9 users are prime candidates for conversion but those with an 8, 7, 6 or dual 5s are not ready to make the move, Edens stated. "Those users have to at least be upgraded to a 9 before they can think of converting to a Level 66. That means there's a tremendous market out there for us."

Edens said he feels Honeywell's recent product announcements, such as retrofitting disks to older iron, are the result of the market of Sigma 5, 6, 7 and 8 users. "They are going to have to keep the user base intact for longer than they thought," he said. "I don't see people with Sigma 6s going to a Level 66 before 1985."

Telefile's relationship with Honeywell, which took over maintenance of the Xerox user base, has been an amiable one so far. Their goals are essentially the same: to keep the Xerox user base alive and up to the state of the art. Telefile, however, doesn't care if the users ever convert to a Level 66 machine, Edens noted.

Edens' firm wants to enhance the Xerox systems not only through core and new peripherals but also by going beyond the specified core limits. That is why Telefile put Memory Map on the Sigma 5. The T8215 Memory Map allows Sigma 5 users to take advantage of the CP-V and CP-R software originally designed for Sigma 6-9 systems and permits multiprocessing.

The entire Xerox user base amounts to only about 1,400 sites, so there isn't much impact on Honeywell's financial picture. But for Telefile, that represents a substantial market, Edesn said, noting there is very little defection among Xerox users.

This means Telefile is not interested in buying Sigmas from users unless there is no way to prevent users from switching vendors. When there is no other way, however, Edens will buy a Sigma 9, for instance, to keep the business intact until Telefile's Sigma 9 emulator is available.

"The Sigma 9 and 11 in development are set up to solve the problem we will face in time when we can't keep the base intact through enhancements and upgrades anymore," he said.

IBM Appoints Three Fellows

ARMONK, N.Y. — IBM has named three new IBM Fellows, an award which provides the three with the opportunity to pursue technical projects of their own choice for the next five years.

The new Fellows are:

- Dr. Alec Broers, a pioneer in the development of high-resolution scanning electron microscopes and in the application of electron beam technology to the fabrication of ultraminiature computer devices.
- Donald K. Rex, for significant contributions to the development of multifunction card-handling equipment. Rex was recently a key figure in the development of a small terminal matrix printer.
- Thomas H. Simpson, the designer of a multitask operating system for the National Aeronautics and Space Administration's Saturn-Apollo program. Simpson's revised version of the system is IBM's Hasp.

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PDP-11 Leading Choice for Military Standard

By Edith Holmes
CW Staff

DALLAS — Digital Equipment Corp.'s PDP-11 architecture is "the leading candidate for the standard" computer that will be used in all U.S. military operations, a conference speaker said here recently.

Spearheading the Military Computer Family Program that eventually could serve all branches of the Department of Defense (DOD), the Army would like to stop inventing computer architectures and look to the commercial world to meet its computer needs, Lt. Col. Alan B. Salisbury of the U.S. Army Electronics Command said.

The DOD spends $3 million a year on software development, according to figures from the Office of the Secretary of Defense. A common architecture base for a family of computers used by the military would give DOD "true transportability of programs between these battlefield systems," Salisbury stated.

By architecture, the Army officer indicated he meant "what the computer programmer sees as he looks at the mainframe from the machine level." In other words, his concern — and DOD's — is with "instruction set architecture."

The Army's attempt to develop a family of architecturally identical machines is not new, Salisbury noted. Between 1969 and 1974, a program called Family of Compatible Computer Elements (Facce) had similar goals.

What the Army learned about computer family interfaces and configurations with Facce will be very helpful in the current Military Computer Family Program, he added.

The PDP-11, will provide the Army with the "form fit in function for computer modules for the military computing" it needs, he said.

No Closed Doors

At the same time, the DEC machines won't mean the Army has closed its mind and doors to research in computer architecture.

In addition, in order to maintain its deployed computer resources, the Army doesn't want to have to have 35 different kinds of spare parts on hand, Salisbury commented.

In terms of continued computer architecture research, the Army will remain interested in system-level modifications — new ways of interconnecting, interfacing and configuring its family of mainframes. "We are particularly looking for ideas in distributed system architecture," Salisbury said.

If military computers are to be able to survive attack, they must be distributed, he contended.

Research in micro-level architectures, the hardware point at which standard instruction sets might be implemented, is also in demand by the Army. Microprogrammable modifications that would permit the system to run new programs and still emulate the old architecture for old software need to be developed as well, Salisbury indicated.

The Army plans to stay with whatever commercial architecture it settles on for the near future. However, the DOD branch expects to be open to expansions of that architecture.

Industry Hit For Lack of Ideas On Architecture

DALLAS — The U.S. government has received very few good private industry research proposals for work to be done in computer architecture, according to panelists at a recent conference here.

The industry has created microprocessors by increasing the density of logic placed on a chip, Dr. John Lehmann of the National Science Foundation (NSF) noted. Now fundamental research is needed that will permit the successful combination of these chips in numbers like 10,000 and up, he said.

These new microprocessor-based computers are likely to be quite different from what we recognize as mainframes and minicomputers today, Lehmann added.

"We will need to develop the interconnections, communications, reliability and fault-tolerance capability for these machines," he stated. The algorithms needed to solve standard computational problems may also require change.

Funds Available

NSF has approximately $1 million available to support basic work in computer architecture, Lehman said. With the lower cost of electronics associated with micro-based processors, he hopes some of this money will flow back to the universities that deferred to industry in the research area during the late 1960s and early 1970s when costs soared.

The Air Force, too, has money to burn in the area of computer architecture if only it could find people with sound proposals to fund, Lt. Col. George W. McKemie of the Air Force Office of Scientific Research at Bolling Air Force Base said.

Among the research thrusts the Air Force believes are needed to accompany the potential that micros have are work in design methodology, performance and complexity and operating system and applications software, McKemie stated.

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At Competitive Disadvantage

U.S. Firms Unsupported Abroad: ADL Head

WASHINGTON, D.C. — Although the U.S. leads the world in telecommunications technology, American suppliers labor under extreme competitive disadvantages in marketing their products and services abroad, according to John F. Magee.

Magee, president and chief executive officer of Arthur D. Little, Inc. (ADL), testified here recently before the International Operations Subcommittee of the Senate Foreign Relations Committee during hearings on the role and control of international information and communications.

'Low interest rates and extended terms are part of the export packages German, Swedish, Japanese and even South Korean equipment manufacturers can offer, but which American suppliers cannot," Magee said. "Those nations look to the longer term, when the very system and products they sell today under such favorable conditions help generate the future cash flow to pay for themselves.".

These aggressively supportive foreign trade programs contrast with policies and attitudes in the U.S. that are passive and even antagonistic, the ADL president continued.

Tax Act of 1976

He cited the Tax Reform Act of 1976 as another factor that has further undermined America's competitive position in the international marketplace. Overseas cost reimbursements to companies and deductions for their employees, formerly allowed to offset the business and personal expense of operating and living abroad, have been eliminated or reduced.

As a result, the American managerial and technical presence in foreign countries is already beginning to diminish. The U.S. is losing one of its strongest selling points — the export of technological talent together with its industrial systems, Magee said.

"In our information-oriented world, telecommunications is a key building block in creating a sound infrastructure for economic growth . . . Telecommunications investments provide more reach per dollar than other investments in bringing people up to the last quarter of the 20th century," he said.

Magee expanded on this view by pointing out that a telecommunications system makes it possible for a developing nation to establish connections with the outside world, helping to break its isolation and the log-jam that keeps its industrial and resource potential locked in.

Traditional Symptom

"Low per-capita telephone density traditionally has been regarded as a symptom of low economic development," he continued. "But now, many of us believe the symptom has become ingrained and should be counted as one of the major causes of underdevelopment."

Magee referred to a traditional view of telecommunications which holds it to be an outgrowth of a solidly established industrialized society whose vitality generates an increasing need for business and personal messages.

"This is now an outmoded thesis rejected by the less-developed and developed nations alike. There is a growing recognition today that telecommunications is more of a precondition than a consequence of industrial and social development," he said.

Calling for a review of long-held biases and for measures to bring U.S. telecommunications export policies in line with current world realities, Magee concluded that "every foreign sale of American high-technology or heavy-industrial systems lays the foundation for add-on business in the same or associated areas.

"Every group of American technicians overseas trains a generation of foreign technicians. This is a kind of technology transfer that creates a continuing demand for more of the same systems, or their successors.

"For every such sale we lose to another country, and for every American technician who does not serve as a technological ambassador, our base of foreign trade is eroded, jobs at home are wiped out and an opportunity to impart understanding and respect for American culture is lost."

Used Unit Sales Up 62% in '76

CHICAGO — Members of the Computer Dealers Association (CDA) sell 39% of the volume of the largest used capital asset business in the world, according to a recent survey taken by the association.

Of the $1.2 billion worth of used computers purchased in 1976, the 64 CDA members sold $463.9 million, an increase of 62% from fiscal 1975.

The report also revealed 96% of these sales were in IBM equipment because IBM's policy allowing maintenance agreements to other than original owners is a tremendous sales advantage. CDA members also spent $87.4 million on new IBM equipment just to support their trades in used equipment.

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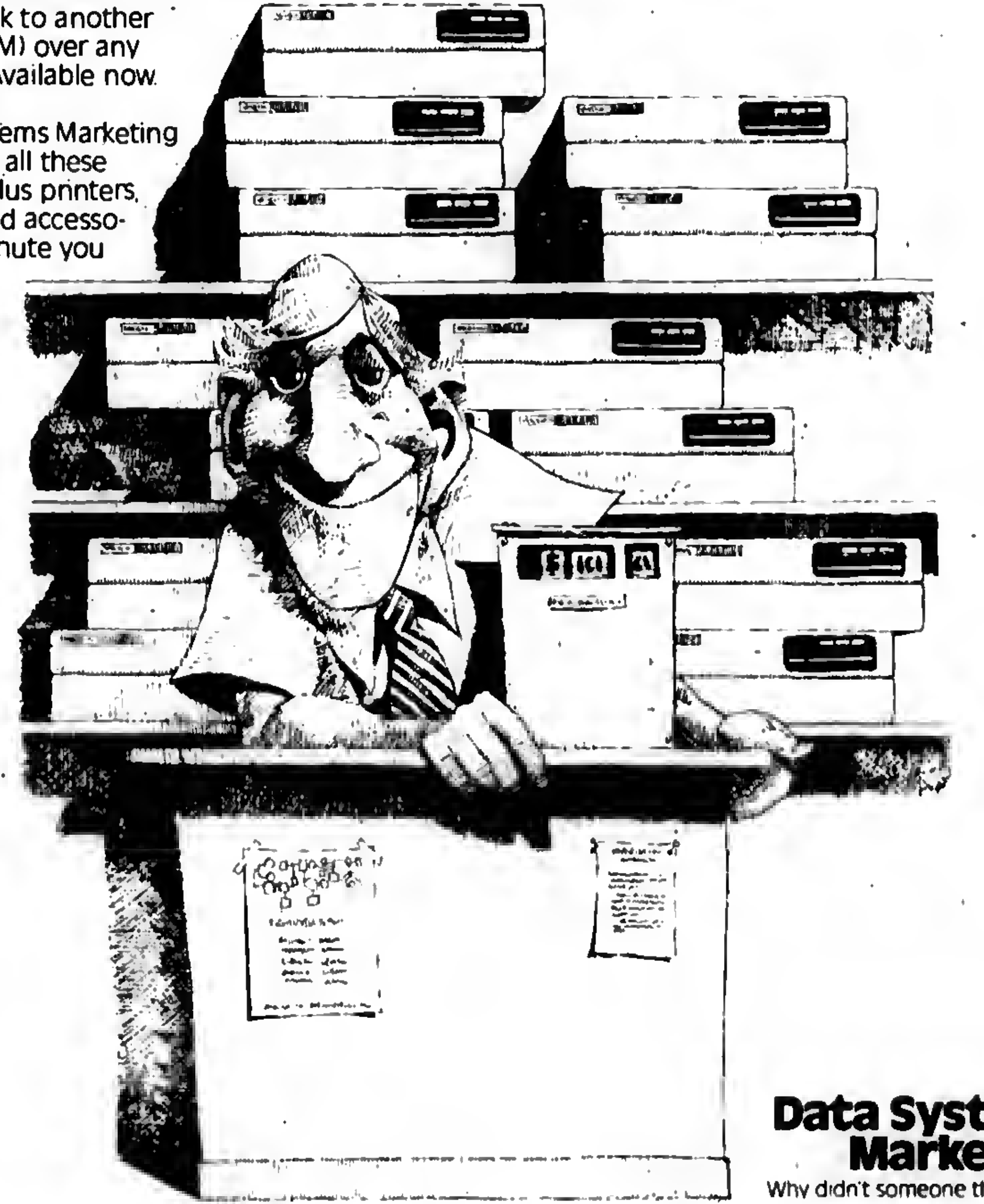

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Orders Up 25% in Quarter

Univac '80 Revenues Seen Topping $2 Billion

By Molly Upton
CW Staff

NEW YORK — Sperry Rand Corp.'s computer revenues should exceed $2 billion by 1980, Chairman J. Paul Lyet told stockholders at the firm's annual meeting here recently.

"Computer revenues have grown 15% per year for the past five years and profits have done even better," Lyet observed.

To add credibility to his projection, he pointed out that Sperry was within 2.5% of its recent five-year projection of earnings per share. Sperry's goal this year is a 12% to 15% increase in earnings.

Sperry prefers not to divulge earnings and revenues of its individual divisions, but Lyet said the Univac division did "very well" in the first quarter in terms of both orders and profits compared with other computer companies.

"We have felt it would be disadvantageous to us to set forth separately how we're doing in our competitive segments," he told a stockholder seeking more information.

The corporate backlog rose 22% from $2.09 billion at the beginning of the fiscal year to $2.2 billion at the end of the first quarter. Univac orders rose 25% in the quarter.

The Sperry Division's orders jumped 99%, reflecting defense contracts.

Univac President G. Gerald Probst said later the Univac orders were distributed across the product line, adding demand for the 1100/80 exceeded expectations. The 90 series — especially ~~the 90/80~~ and 90/30 — was also strong, he added.

New Products Coming

Lyet told the press Univac will have some product announcements it thinks are going to be significant in the next 12 months.

The firm is continuing to invest "very substantially" in research and development in the 1100 and 9000 series, as well as the 90/30 family.

"At Sperry Univac in particular, we have spent more on R&D as a percentage of revenue than any of our four largest competitors over the last five years," Lyet told shareholders.

"This means we have products in the oven we can serve up in future years that will provide continued growth.

"R&D spending will be up 13% to 15% this year," he continued. Last year the firm spent $168 million in R&D, 60% more than five years ago.

The firm is working on LSI circuitry, fiber optics, electron beam lithography and a nonimpact printer with speeds of 10,000- to 20,000 line/min, he said.

None of the products coming out within the next 12 months will have bubble memories, he told the press.

Sperry has great hopes for its latest acquisition, Varian Data Machines, Lyet indicated to the press.

Noting that Information Storage Systems (ISS) has been one of Sperry's most successful acquisitions, Lyet said he feels this type of benefit will be paralleled by the Varian acquisition. He expects Varian's growth to be as rapid as that of ISS, he added.

Robert E. McDonald, president of Sperry, said the basics are there, but Sperry is adding some management and marketing capabilities. He admitted the Varian software needs some help and the product line should be broadened.

When asked about the impact of the IBM 3033, McDonald said Univac brought out the 1100/80 with the recognition that IBM would have a powerful machine. Univac has not been impacted by the 3033 and has "won some tough competition," he added.

"I suppose if IBM had not brought out the 3033, maybe our profit margin would have been greater, but that's not the real world," he mused.

McDonald indicated he thinks the specter of a price war among IBM plug-compatible CPU makers, including the Japanese, "a significant long-term competitive challenge."

Lyet reiterated, as he does every year, Univac's eagerness to form joint ventures similar to the one it has with Saab Scania. Noting he is very pleased with Saab Univac AB, which has obtained orders from Scandinavian Airlines for an airline reservation system and from the Swedish postal authority, Lyet said such a joint venture ought to work in other parts of the world.

Surmising on why Univac has not had any other takers, Lyet observed firms in other countries have had good support from their governments. He also suspects they don't want to be captive to the Americans in the computer business since it is so integral to business. "They want to be master of their own fate," he added.

"We still stand ready to deal and have got our antennae up," Lyet said.

Extolling the virtues of expenditures, Lyet said that in five years about 80% of Sperry's revenues will come from products not on the market today. "This is how to keep a company viable, dynamic and alert, even though it impacts your P&L statement," he said.

Lyet expounded on his theory of why Sperry Rank's stock is as low as it is. When computer stocks were high, Sperry's revenues were more cyclical and although the firm was a conglomerate, it was "metaphorphasizing" into a computer company.

After extensive efforts to educate the investment community that it should be treated as a computer company, the computer stocks started to go down. In the meantime, farm machinery was becoming suspect because of uncertain demands.

Sperry Earnings Rise 7.8%

NEW YORK — Earnings increased by a larger percentage than revenues at Sperry Rand Corp. during the first quarter ended June 30, which marked the firm's 21st consecutive quarter in which earnings and revenues showed improvement over the year-ago period.

Earnings hit a record $37.5 million or $1.08 a share, up 7.8% over the $34.8 million or $1 a share in the same period last year.

Revenues rose 5.1% to $827.9 million compared with $788.1 million in the same 1976 period.

On a 12-month running basis, revenues were up 2.8% to $3.3 billion while earnings rose 8.7% to $159.5 million.

By March 1978, Univac will have increased its commercial marketing force, exclusive of the organization set up for the BC/7 and the people gained through the Varian acquisition, by 44% compared with nearly two years ago, Sperry Rand Chairman J. Paul Lyet said.

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Bowers Adds Five Services

FAIRFIELD, Conn. — Bowers Engineering Co. has added five fixed-price packaged services to its line of consulting and engineering packages.

The Quick Study was designed for investors, potential acquirers or users planning a major vendor commitment, and in need of a professional overview of a company, its personnel, products, resources, competence, etc. Quick Study is said to offer a one-day on-site analysis, with written report, for $500 east of the Rockies, $750 in the West.

Acquisition Analysis was designed for companies seeking to acquire products or other companies in a particular technical area. It identifies potential acquisitions and evaluates the companies, their products, market position and financial strength, the firm said.

The top candidates are selected and evaluated on-site, and recommendations and strategy are presented. The package is priced at $3,900.

OEM Buyer Analysis identifies attractive markets and potential OEMs for a client product, the firm claimed. The OEMs, their market strengths and their make/buy attitudes are assessed and the top prospects are evaluated on-site for a fee of $3,900.

Equipment Evaluation is offered to users considering equipment purchases, vendors wanting an independent critique of their equipment, and acquirers needing to understand the quality of a product they are acquiring, Bowers said.

The equipment of interest and its vendor's methods are evaluated as to design, manufacturing processes, testing and quality control in light of the client's needs and applications. Existing installations and customers are investigated for $2,700.

Competitive Analysis consists of a survey of equipment or service being marketed, vis-a-vis a client product or a contemplated product, according to Bowers. It includes an analysis of the client's product, a complete survey of all competitive companies and analysis of their products and markets for a fee of $2,700.

Bowers is located at 1214 Post Road, Fairfield, Conn. 06430.

Expansions

Data Terminal Systems, Inc. will begin construction of a three-story 75,000 sq-ft addition to its existing manufacturing space in Maynard, Mass., and a 40,000 sq-ft renovated facility in Stow, Mass.

Synertek has begun construction on a 61,000 sq-ft facility in Santa Clara (Calif.) Business Park to be used as its corporate headquarters.

Computer Automation, Inc. has more than doubled its operating space with the completion of an 81,000 sq-ft facility at 2181 Dupont Drive, Irvine, Calif.

Magnetic Peripherals, Inc. has expanded its production operations with the addition of a 40,000 sq-ft Aberdeen, S. Dakota plant.

Unitrode Corp. has begun operations in its 10,000 sq-ft production facility in San Diego.

National Data Corp. of Atlanta has established a branch at 17921 Sky Park Circle in the Airport Industrial Complex at Irvine, Calif.

Compu-Serv Network, Inc. has begun building a $1.2 million computer center near Dublin, Ohio.

Linolex Systems, Inc. has moved its manufacturing and product development facilities to Bedford, Mass.

New Registrations

MEMOREX CORP., San Tomas at Central Expressway, Santa Clara, Calif. 95052, filed to register 200,000 shares of common to be issued in connection with the merger of Lencor International into a wholly owned subsidiary of Memorex. The merger will result in the conversion of the outstanding shares of common of Lencor into the Memorex common and $2,440,000 in cash (subject to certain adjustments). No underwriter is involved.

MOTOROLA, INC., 1303 E. Algonquin Road, Schaumberg, Ill. 80196, filed to register 2,250,000 shares of common to be issued to the stockholders of Codex Corp. pursuant to a statutory merger of a wholly owned Motorola subsidiary into Codex. Motorola will issue 1.125 shares of Motorola common, subject to certain adjustments, for each share of Codex common outstanding on the effective date of the merger. No underwriter is involved.

AMDAHL CORP., 1250 E. Arques Ave., Sunnyvale, Calif. 94086, filed to register 560,000 shares of common to be offered for selling security holders through underwriters represented by the First Boston Corp., 20 Exchange Place, New York, N.Y. 10005, and E.F. Hutton & Co., Inc., One Battery Park Plaza, New York, N.Y. 10004. Of the 560,000 shares being offered, 460,000 are presently outstanding and 100,000 are to be issued upon exercise of warrants held by two security holders.

ITEL CORP., One Embarcadero Center, San Francisco, Calif. 94111, filed to register 2 million shares of cumulative preferred to be offered for sale through underwriters represented by Blyth Eastman Dillon & Co., Inc., One Chase Manhattan Plaza, New York, N.Y. 10005, and Paine, Webber, Jackson & Curtis Inc., Broadway, New York, N.Y. 10005.

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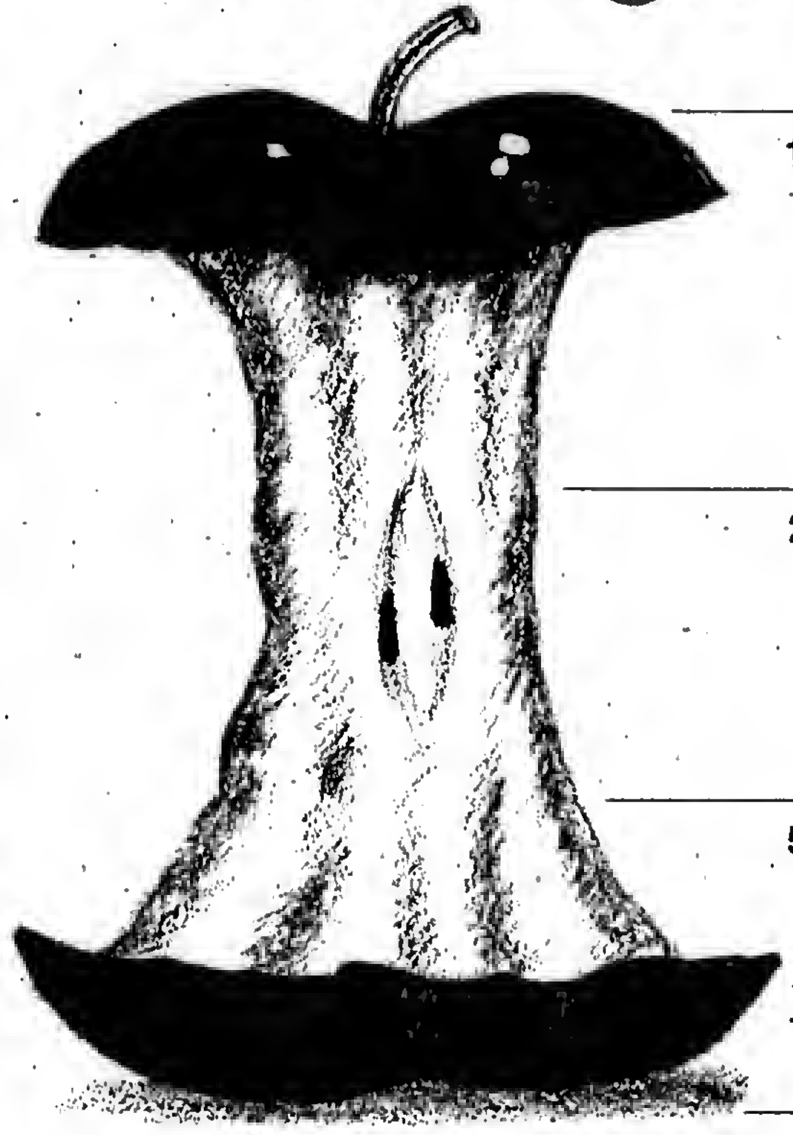

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Small Business Mart Seen Growing Abroad

LONDON — The installed base of small business systems in Europe is imposing, but the most impressive growth is in annual shipment figures, according to *EDP/Europa Report* (EDP/ER).

"With the lines of demarcation between the [small business system] and systems larger and smaller becoming hazier each year, the [small business system] is one of the most pervasive influences in the computer world," EDP/ER said, but noted that defining a small business system is all but impossible except by example.

International Data Corp. divides the market into three segments: the low-cost minicomputers-based systems costing $20,000 or less (NCR 399, Nixdorf 820, Digital Equipment Corp. 300); the middle range with prices between $20,000 and $50,000 (IBM System 32, NCR Century 8200, Honeywell Information Systems Level 61, DEC Datasystem 500); and the top end with prices up to $150,000, which could include some general-purpose systems such as the Burroughs B1700, International Computers Ltd. 2903 and Univac 90/30.

EDP/ER projected the installed base in Europe will grow from $6 billion at year-end 1976 to about $14 billion by the end of 1980, when annual shipments will reach $3.5 billion.

"Over this period it is also expected that the price of the smaller units will continue to fall as a result of the influence of microprocessor technology [and] medium-priced units will increase in price as the complexity of the [small business system] increases. At the larger end of the scale, the most important factor [is] the cost of the software for systems and applications.

The report noted that the most important difference between the European and the U.S. markets is the importance of independents in Europe, most of whom have developed from the traditional office equipment markets, according to the newsletter.

International News

In terms of market share by value, IBM tends to dominate in the larger systems area except in France, where CII/Honeywell Bull holds 38% of the market compared with IBM's 36%, and in the UK where ICL/Singer has 30% of the market compared with IBM's 25% and Burroughs' 20%.

The giant, however, commands 50% of the German market, according to EDP/ER figures.

In the small arena, the market shares are much more evenly spread. In Germany, for instance, Nixdorf has 30%, Kienzle 20%, Philips 15% and Olivetti 12%.

Philips claims 20% of the French smaller system market, while Kienzle and Nixdorf each have 15%, Olivetti 12% and Burroughs and Logabax each 10%.

Burroughs dominates the UK market with 40% followed by NCR with 20% and Olivetti and Logabax with 10% each, EDP/ER said.

"It will be seen that the situation at the moment is open, even IBM's dominance is only relative and there would appear to be a chance for all," EDP/ER stated.

Soviets Start Building New Generation CPU

YEREVAN, Soviet Armenia — The Soviets have begun batch production of the Nairi-4, a fourth-generation computer, at the Elektron plant here, according to the Novosti Press Agency in Moscow.

"Its productivity is 500,000 operations per second and it has an internal storage capacity of 64,000 alphanumeric symbols," Novosti stated.

The Nairi series of computers, designed by the Yerevan Research Institute of Mathematical Machines, are used throughout the USSR and other countries, the agency said. They are small multipurpose machines used for financial, design and research applications, it noted.

The Nairi-4 differs from previous models in that "for the first time a model in which the principle of nanoprogramming is employed has been designed in the USSR," according to a Novosti release.

"It ensures the interpretation of a system of microcommands and the unification of the means of control.

"Because of the use of so-called microbrackets, the size of the machine was reduced and its reliability was enhanced. The structural possibilities and technical parameters of the computer make it possible to tune it to the solution of various concrete problems," Novosti stated.

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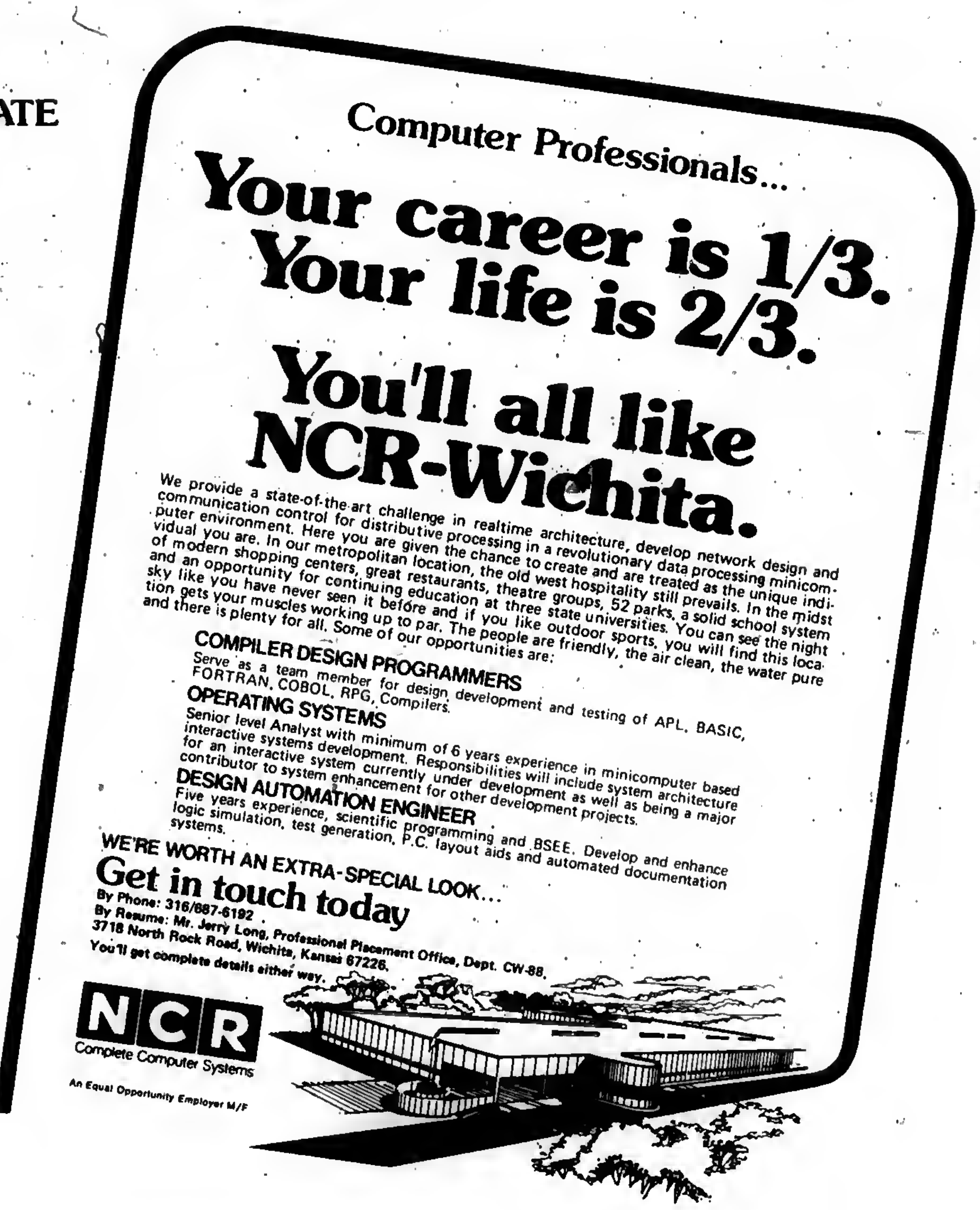

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A special report on *Minicomputers and Small Systems* in the August 29th *Computerworld.*

Minis are now functioning at every level of business and industry, and *Computerworld's* August 29th special report, edited by Esther Surden, will focus on several issues that are currently the subject of widespread discussion and debate in the minicomputer field. We'll also cover minicomputer hardware in depth — including microcomputers being used in data processing systems. In all, you'll see a variety of applications stories and tutorials on topics like these:

- Programming languages for small business systems — commentary on languages that have the same name but because of the "improvements" added by competing vendors, may have wide variances in operating efficiency.
- How to evaluate technical evaluations — a look at what benchmark tests and product specifications mean.
- The evaluation and selection process — a case study.
- Minicomputer maintenance — analysis of possible methods (vendor maintenance, independent service organizations, and end user self-support) with an eye to cost savings.
- Minicomputers in distributed processing — stand alone and communicating.
- Using minicomputer equipment — including general purpose minis, small business systems, turnkey systems, miniperipherals and microcomputers.

If you're interested in finding new ways to make data processing more useful and cost effective throughout your organization, you should read our special report in our August 29th issue And if you're a mini manufacturer, OEM or systems house who's interested in telling potential customers how your equipment can help them in their jobs — advertise here. Your *Computerworld* salesman can give you complete details. But don't miss the August 12th ad closing date. Call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Contracts

Electronic Memories & Magnetics Corp. has been awarded a fiscal contract by the U.S. General Services Administration for 360/30 and 360/50 add-on memory.

Optimum Systems, Inc. has received a contract from Arkansas Blue Cross and Blue Shield for DP and support services.

The Western Union Telegraph Co.'s Government Systems Division. has been awarded a contract by the U.S. Army Electronics Command. The contract will provide a digital data communications system consolidating high-speed data and secure voice requirements of various U.S. government and intelligence agencies.

Metromation International, Inc. has been awarded a contract by Shell Canada Ltd. to furnish Shell's Chemical complex at Sarnia, Ont., with a computer-based process control system.

Kokusai Denshin Denwa Co. of Tokyo has been awarded a contract by the International Telecommunications Satellite Organization (Intelsat) for the collection of rain attenuation propagation data at 11.6 gHz.

Wyle Laboratories has been awarded a contract by the National Aeronautics and Space Administration's Langley Research Center for instrument support services.

Keane Associates, Inc. has been awarded a contract by the New England Power Exchange to develop an automated billing system.

National Data Corp. and Atlantic Richfield Co. have signed a credit card facilities management services contract.

Raytheon Service Co. has received contracts from Management Reports, Inc. of Cleveland, Mayflower Farms of Portland, Ore., and Watts Regulator Co. of Lawrence, Mass., for computer maintenance and field service.

POSITION ANNOUNCEMENTS

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Allentown and Sacred Heart Computer Center, shared non-profit organization serving four hospitals, is seeking candidates for the following positions:

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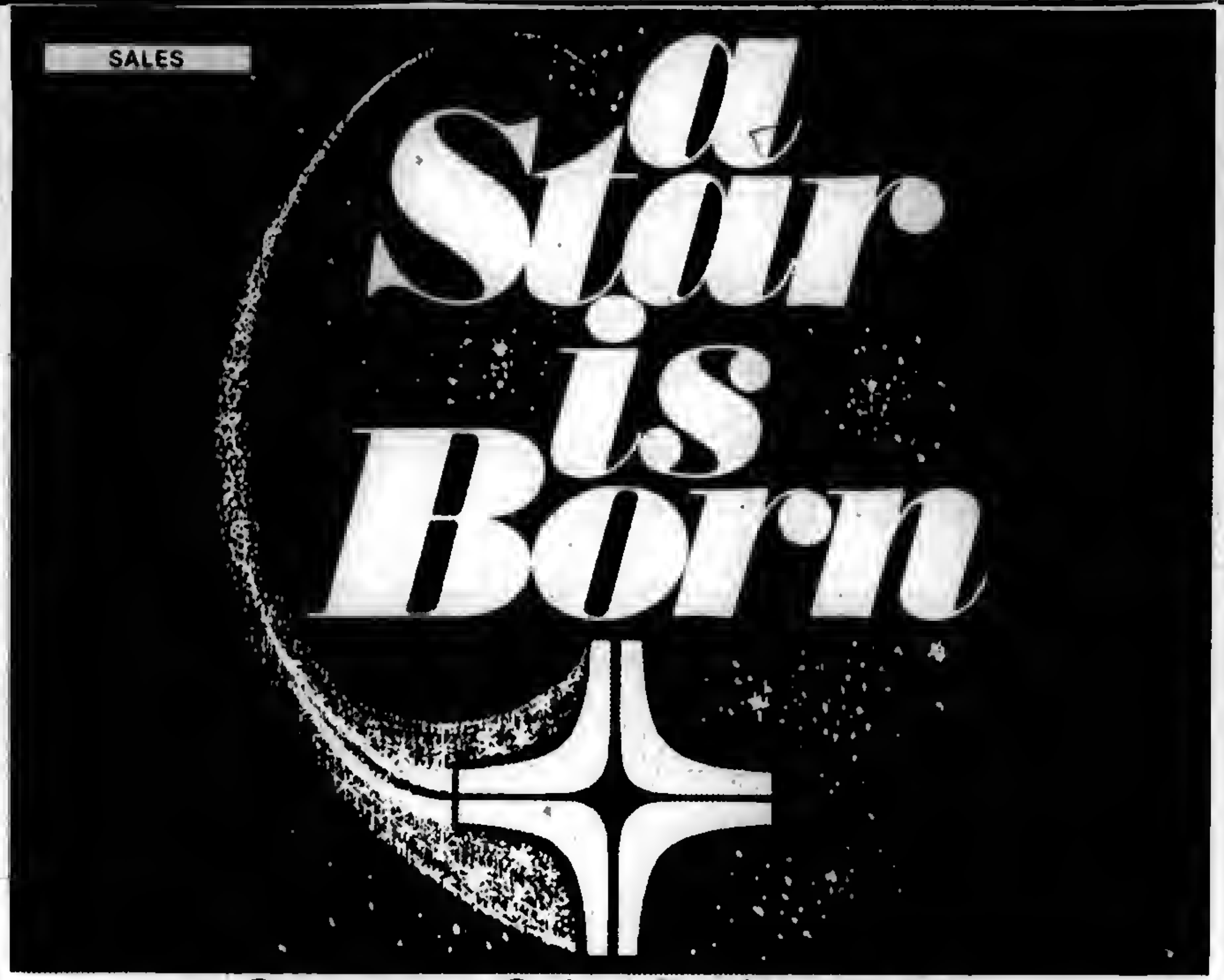

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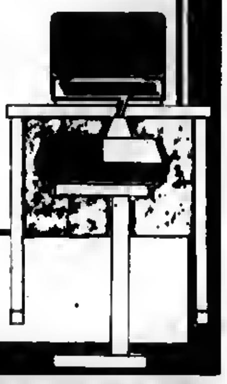

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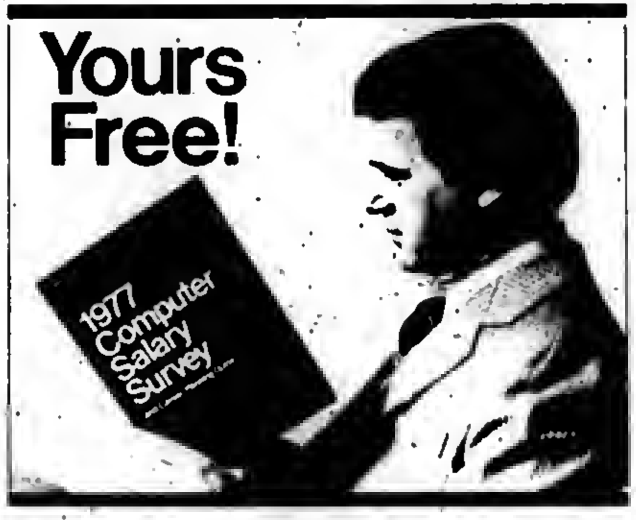

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Greenwich	203/869-5977	Dallas	214/387-1600
Hartford	203/522-6590	Denver	303/773-3700
New York	212/736-7445	Fort Worth	817/338-9300
Philadelphia	215/665-1717	Houston	713/626-8705
Union, N.J.	201/687-8700	New Orleans	504/561-6000
Wash., D.C.	703/790-5610		
Wellesley, Ma.	617/237-3120		
Midwest		**West Coast**	
Chicago	312/782-0857	Encino, Ca.	213/995-8866
Oak Brook, Il.	312/986-0422	Irvine, Ca.	714/833-1730
Cleveland	216/771-2070	Los Angeles	213/386-5500
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Kansas City, Mo.	816/474-3393	Palo Alto	415/328-7155
Minneapolis	612/544-3600	San Francisco	415/434-2410
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source edp

(When writing, please be sure to indicate home address and current position title.)

If unable to call, write:
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Advanced Software Design

Applications/Systems/Data Base Design

Telecommunications is one of the most rapidly growing segments of the software frontier. We have major projects underway now . . . forerunners of our long-term commitment to significantly advancing the state-of-the-art. We're working from definition and design through development and implementation in areas such as CAD, Data Base Systems, Simulation, Fault Recovery, Diagnostics and many areas of software design in an on-line, real-time environment

Software Design Engineers

We're looking for an indepth background in the development of systems software and a minimum of 3 years' experience in structured design, testing and documentation of programs running on large data base, multi-file systems in real-time. Familiarity with HIPO design documentation, TSO usage and software simulation techniques as well as PL1, Fortran and assembler languages for the 8080 and PDP 11 programming is also important.

Data Base Design

You will need a minimum of 5 years' experience in the planning, development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

Computer Aided Design

We are looking for an extensive background in the design of CAD/CAM systems and the development of Interactive access by the users of CAD/CAM functions. Required is 5-10 years' experience in both hardware and software aspects; DA systems operations, and design, and systems engineering. Your initial responsibilities will include evaluation of existing systems, and working with a project team in the Architectural Planning of a major new system.

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We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing mini-computers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

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We are seeking individuals to develop Wholesale Distribution Systems or Manufacturing Systems design for sales worldwide.

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Individuals should have a thorough understanding of manufacturing systems in an interactive or on-line environment with at least 3-4 years data processing techniques in a manufacturing environment.

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Individuals should have an understanding of "HIPO" and/or other structured design and programming techniques with at least 3-4 years experience with data processing techniques in a wholesale environment.

Candidates for these positions should possess a BSCS, technical related degree or equivalent work related experience.

Let us hear from you! We will give you a quick reply. Send your resume with salary history to:

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Mr. Max Anderson
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

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Scientific Computing Consultant

Our Corporate Computing Center has an opening for a scientific computing consultant. Major responsibilities will consist of providing programming and debugging assistance to scientific computer users, conducting seminars and short courses in FORTRAN, JCL and other programming subjects. Other duties will include writing user documentation and participating in software product evaluation and software quality assurance testing.

A Bachelor's degree in mathematics, computer science or in a related scientific field is mandatory. Experience in scientific programming with extensive knowledge of FORTRAN and OS or VS JCL, teaching experience, good communication skills, and an ability to work well with people are essential.

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Reports to Division President. Responsible for planning, designing, implementing, executing and controlling all systems. Supervises the data process function, coordinates operations with sister division in telecommunications environment and recommends the acquisition and justification of data processing equipment.

REQUIREMENTS:

Manufacturing environment. Strong systems development in areas of:

- MRP, cost system, order entry, shop floor control, production planning, standard financial systems, inventory control.
- Supervisory experience of data processing operations.

HARDWARE-Systems 3, systems 360 MOD 30
LANGUAGES-RPG, RPG II
SOFTWARE-DBOMP, CICS

EDUCATION:

Business Administration, Computer Science, Industrial Management.

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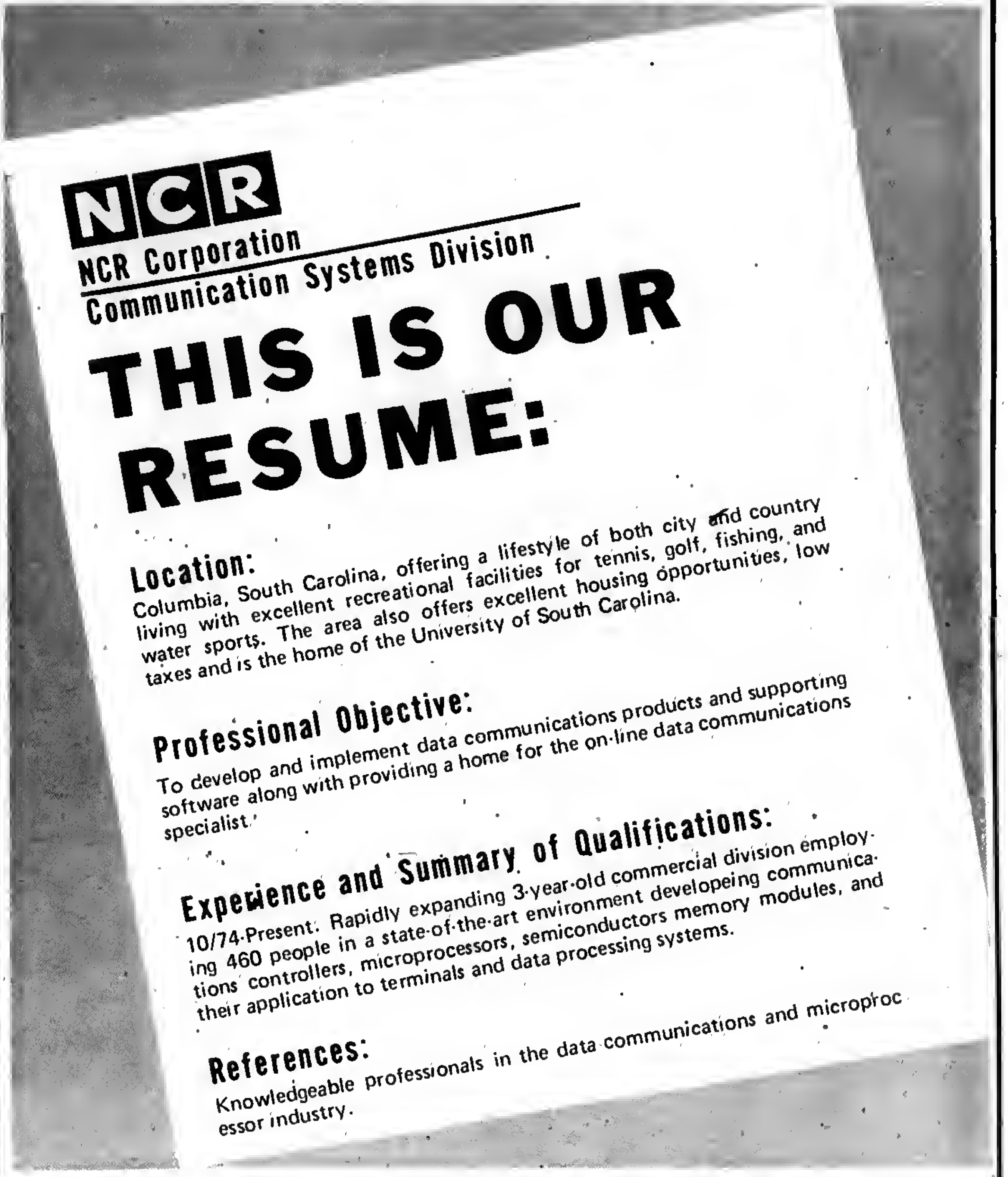

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- Microcomputer diagnostic software
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- Knowledge of characterization and qualifications requirements of LSI

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(Hardware/Software)

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NCR Corporation
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communications software development

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Dallas, Texas 75207

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Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2560
Southfield, Michigan 46075

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W 7th Ave
Miami, Florida 33169

HARTFORD
Compass, Inc
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Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010

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ANS COBOL experience of at least three to five years in a business or financial environment is essential. We desire familiarity with: OBMS, DB/DC, CICS, ALC or file access methods. Experience with hierarchial design will be helpful. Will be assigned to complex projects of design and implementation. Excellent communication skills necessary because of heavy user contact.

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Requires fluency in COBOL and background including IBM 370 using MVS and OS/JCL. These individuals must have a system background of at least two to three years. Also must be capable of involved and complex system and program design. Excellent communications skills important. On-line program development experience a plus.

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Multi-billion dollar manufacturing company located in Northern New Jersey is seeking a data base manager to assist in the start up operation of a data base under IMS/VS. Must have practical experience in IMS/MVS. DB/DC. Ideal candidate should be a team player since he will play an integral part in putting together the data base group and in determining the direction the company will go.

Contact Diane Dohoney
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Harris Corporation, Computer Systems Division, has the following Quality Assurance positions available in our Fort Lauderdale location.

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Will be responsible for component evaluation as related to quality requirements. In addition, vendor evaluation and liaison will be required of the successful applicant. Experience is required in failure analysis and incoming inspection support in the areas of IC's, semiconductors, passive components, PC boards, and electro-mechanical assemblies. A BSEE with 4-7 years experience in the computer industry is desirable.

RELIABILITY ENGINEER

Will be responsible for reliability engineering and analysis. Will make assessments on design as they relate to product reliability. MTBF and MTTR predictions as well as statistical analysis of component and equipment life characteristics are required. Emphasis will also be placed upon failure analysis. BSEE plus 3-5 years' computer industrial background is required.

SUPERVISOR-LINE INSPECTION

The successful candidate must be knowledgeable and experienced in Quality Assurance and assembly operations inspections. Responsibilities also include supervision and inspection of computer and related electronics. We require a minimum of 3 years' of supervisory experience in the above area.

The above are growth positions and are expandable towards higher management responsibility within our division.

Send your updated resume in strictest confidence, along with current salary information, to Mr. George Mikus, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Ft. Lauderdale, Florida 33309.

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Wisc. Prog	16-18K

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Suite 228, Hinsdale, IL 60521

DIRECTOR OF TECHNICAL SERVICES

Due to expanding computer support and networking needs we are seeking an individual to head up the technical portion of our data processing functions.

Qualified candidates must minimally possess the following experiences and skills:

- 3-5 years software development
- 3-5 years operation and teleprocessing
- equipment and software evaluation
- heavy user involvement
- 3 years successful technical management

Our director of technical services and his staff will be responsible for: software development and operations, remote location support, optimization, tele-communications.

If you possess the above skills and are interested in joining a rapidly growing multi billion dollar per year upper midwest corporation, please send your resume and salary history to:

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With a team of more than 8,000 computer people and an international reputation for sophisticated computer software and hardware applications, Computer Sciences Corporation qualifies as the leader in the information sciences industry.

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- PROGRAMMER/ANALYSTS - With IBM 360/370 experience in COBOL, FORTRAN, JCL, ALC, PL1 or TSO; Sigma 5 and 7; CDC 3200. (Greenbelt, Md.)
- SYSTEMS PROGRAMMERS - With IBM 360/370 experience in OS/VS1, JCL, ALC. (Greenbelt, Md.)
- PROGRAMMER ANALYSTS - With U 1108 COBOL experience, EXEC 8 helpful. System 2000 DBMS. (Falls Church and Norfolk, Va., Jacksonville, Fla., and Ridgecrest, Calif.)
- SYSTEMS ENGINEERS - With BSEE to interface U 1108 to IBM 370; Communications Systems Engineers with experience interfacing mini's to U 1110. Knowledge of computer-communications terminals helpful. (Greenbelt, Md. and Ridgecrest, Calif.)
- PROGRAMMER/ANALYSTS - With H-6000 GMAP; COBOL and a variety of applications. (Kennedy Space Center, Fla.)
- APPLICATIONS ENGINEERS - With BSE or Physics and FORTRAN programming experience to work in areas of aerodynamics, control systems, aircraft simulation and graphic displays. (San Francisco, Calif.)

For immediate and confidential attention, please send resumes with salary history to:

Gus Siekierka
Director, Industrial Relations

COMPUTER SCIENCES
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Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046
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ENGINEERS

Make Your Future with the Leader

Datapoint Corporation, the leader in dispersed data processing, has openings in its San Antonio facilities for qualified engineers in the following categories:

RELIABILITY ENGINEER

We are looking for a hands-on engineer to perform reliability improvement studies on our computer systems and associated peripherals. Applicants should have a BSEE degree or equivalent and one to three years experience in design or reliability improvement programs.

QUALITY ENGINEER

Primary responsibility will be evaluation of product line quality and directing corrective action. Must have a minimum of five years hands-on computer hardware experience and be capable of establishing acceptance standards for new products and processes. Must be motivated individual. A BSEE, Engineering or science degree is required.

TEST ENGINEER

To design test equipment and generate test programs for data processing products. BSEE degree, or equivalent, with three or more years experience in digital design and assembly language programming.

These positions offer excellent salaries and benefits, the opportunity for rapid advancement, and a challenging work environment in a growth-oriented company. Send resume with full salary history to **Mr. Chuck Zeleny, Manager of Employee Relations, Dept. CW, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

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DATAPOINT CORPORATION

The leader in dispersed data processing™

CSC

PROGRAMMERS OPERATIONS RESEARCH SYSTEMS ANALYSTS

CSC's System Sciences Division is further expanding its capabilities by creating additional career growth positions for qualified computer professionals in support of our FAA Air Traffic Control & Simulation Support programs in the Atlantic City, New Jersey area.

Current opportunities exist for individuals with a degree in Physics, Engineering, Operations Research, Statistics, Computer Science, or equivalent experience and who have a background in any of the following areas:

- **Modeling/Simulation**
- **Minicomputers-**
  XDS-Sigma series preferred
- **Assembly language**
- **Performance Analysis & Modeling**
- **Human factor Studies**

Join our team in the development, implementation and enhancement of our Air Traffic Control programs involvement.

CSC offers a liberal relocation policy in addition to a complete benefits package.

For immediate consideration, please send resume to:

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System Sciences Division
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Large-Scale Opportunities in Advanced-Technology EDP Systems Development

SENIOR SOFTWARE SPECIALISTS

Several positions are currently available consisting of the development of a very large distributive processing system and will include advanced state-of-the-art technology. Will utilize the entire spectrum of EDP equipment from mini's to large mainframe and a large assortment of associated peripherals and other devices, i.e. terminals, etc. Minimum of 5 years' experience in the development of systems software with the preponderance of this experience in telecommunications, networks and file processing, plus a background in operating systems, plus expertise in COBOL and assembly languages necessary with strong preference for a related degree.

DISTRIBUTIVE PROCESSING SYSTEM DEVELOPMENT

Positions are available in the development of a very large distributive processing system, advancing the state-of-the-art technology utilizing the spectrum of EDP equipment — minis to large mainframe with assorted peripherals and terminal devices. Experience in telecommunications, networks, file processing or operating systems plus expertise in COBOL.

If you are interested in being considered for one of several new positions with us, please send your resume and salary history/requirements to Thom Harris.

NCR

Special Systems Division

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TECHNICAL DIRECTOR OF DATA PROCESSING

NATIONAL OPINION RESEARCH CENTER

NORC is a not-for-profit social science survey research organization affiliated with the University of Chicago, with central office in Chicago and a New York office. NORC employs 300 persons, and a large national field staff is maintained.

Immediate opening for Technical Director of Data Processing, based in Chicago. This position plans and supervises the activity of 15 to 20 employees in NORC's data processing departments in Chicago and New York. Specific duties include:

planning and evaluation of software for eventual importation or internal development; development and operation of data base entry and editing facilities; planning and decision-making in the area of proposal development and proposal writing; responsibility for Data Processing budgeting and budget management; interaction with operations and administrative staff of organization.

Requirements include: some post-BA education in computer science or a related field desirable; an MBA, MA, or equivalent ideal. Work experience with data processing, ability to design and evaluate software, and writing skills essential. Familiarity with IBM 370/OS and some exposure to on-line systems essential. FORTRAN essential, PL/1 desirable, and some exposure to Assembler language useful.

Salary range from $18,000-$25,000, depending on experience. Submit resume to:

Garth Taylor, Chairperson
DP Director, Search Committee
Nat'l. Opinion Research Center
6030 S. Ellis Avenue
Chicago, IL 60637
AAA/EOE

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Expanding major property and casualty insurance carrier seeks experienced programmers and programmer analysts with COBOL, IMS O/S background.

Good advancement plus generous fringe benefits including tuition reimbursement make this an excellent opportunity for qualified candidates. Will assist in relocation expenses to St. Paul.

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MARKETING COMMUNICATOR

Harris Computer Systems, a manufacturer of large-medium scale digital computers has a Senior Marketing Communicator position at our Divisional Headquarters in Fort Lauderdale, Florida. The individual we seek must have a minimum of 3-5 years experience in the data processing community with emphasis upon public relations, technical EDP communications (both written and verbal), planning, researching and preparing press oriented programs. Additional responsibilities will include preparation of application briefs and bulletins plus technical articles for presentation. A degree in Journalism or English is preferred.

Send your resume in complete confidence to W.D. Taylor, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

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Owens-Corning Fiberglas is the world's leading producer of glass fiber products and materials critical in the conservation of energy and reduction of construction costs. We are a billion dollar corporation, headquartered in Toledo, Ohio with 73 manufacturing plants and international operations in 12 countries.

The rapid growth of the corporation has resulted in a 40% increase in the size of the Management Information Systems staff since 1975, and the implementation of improved productivity techniques (chief programmer teams and structured analysis, design and programming). We offer excellent personal compensation and career development opportunities to data processing professionals with proven capabilities. Our data processing environment currently includes: OS/VS, CICS, COBOL, IDMS, ROSCOE, PANVALET, and COMTEN communications.

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Or send a current resume with salary history in confidence to: Mr. G.T. Mills, OWENS-CORNING FIBERGLAS, Fiberglas Tower, Toledo, Ohio 43695.

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PROGRAMMER ANALYSTS SYSTEMS ANALYSTS

Hanes Hosiery, Inc. has challenging positions open for systems analysts — programmer analysts.

We seek creative individuals with proven abilities in the above positions. Knowledge IDS and TDS a definite plus. Degree preferred.

These positions offer involvement with a large scale Honeywell computer utilizing GCOS operating system, time sharing, on-line program development, transaction processing, and data base management systems.

In addition to an attractive salary and liberal benefits package, you'll enjoy the advantages of living in a mild, sunny, southeastern location. Please send resume with complete salary history in confidence to:

Hanes

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Personnel Department/Systems
Hanes Hosiery, Inc.
P.O. Box 1413
Winston-Salem, N.C. 27102

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SR. DATA BASE SYSTEMS PROGRAMMER

We are seeking an experienced individual who will work with our Systems and Programming groups in developing, designing and implementing the physical and logical IMS data bases including backup/recovery/reorganization of such data bases.

Qualified candidates will have two to five years' in designing and installing physical and logical IMS data bases and an appropriate Bachelors Degree or the equivalent.

We offer competitive salaries and a comprehensive benefits package which includes profit sharing. Send your resume including salary requirements to Judith B. Godsill, Dept. 88-CW, The Foxboro Company, 38 Neponset Avenue, Foxboro, MA 02035. Foxboro is an equal opportunity employer M/F.

FOXBORO

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Computer Systems Development

We are a progressive NYSE-listed company seeking a well-versed Project Leader who is ready to assume major responsibility in our MIS expansion program.

REQUIREMENTS: Minimum 5-7 years systems & programming experience in both batch & on-line environments, expertise in project management and usable working knowledge of IBM equipment from system 3 to large scale 370. Exposure in distributive processing on IBM 3790's desirable; college degree preferred.

ASSIGNMENTS: To plan, organize and lead the design, programming and implementation effort of our distribution & manufacturing oriented systems.

COMPENSATION: Realistic prospects for increasing responsibility & career development, excellent starting salary & comprehensive benefits program. Location: Attractive Eastern Great Lakes area offering pleasant suburban type living.

Send resume with earning history in confidence to:

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DATA SYSTEMS ENGINEER

A multi-facility medical complex consisting of over 900 beds and 3100 employees seeks an individual with experience in minicomputers and data communications. Desired experience in distributed processing with existing IBM host system supporting teleprocessing. Will work in technical support team. Hospital experience desirable but not necessary. Excellent fringe benefits. Salary open DOE. An Equal Opportunity Employer. Please direct resume to:

Vice President-Human Rasources
Baptist Medical Centers
3201 4th Ave. South
Birmingham, Ala. 35222

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F/T FACULTY POSITION
FALL 1977
Information Science

Responsibilities include teaching undergraduate courses in computer design, data structure, computer languages and software systems. Requirements: PhD in Computer Science or ralated field (ABD with experience considered), background in teaching desireble. Asst. Prof.: $13,800-$15,200 Assoc. Prof.: $16,800-$18,500 Rank and salary commensurate with qualifications. Resumes by August 19 to Dean T. Marton, Stockton State College, Pomona, N.J. 08240.

AAA/EOE

Programmer/ Analysts

for Washoe Medical Center, Reno, Nevada. NCR experience desirable. Room for advancement, Excellent Western location.

Good salary and benefit package, including state retirement plan.

Call weekdays (702) 785-4156, or apply:

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Sycor, Incorporated, a leader in the manufacture of distributed data processing systems, is currently seeking qualified individuals for systems programming positions.

SYSTEMS PROGRAMMERS

Minimum two years' experience as a Systems Programmer in any of the following areas:

- Data Communications
- Compilers and Languages
- Access Methods
- Data Base Management Systems
- Operating Systems

Experience in Mini/Micro computers with Assembler language is desired. BS in Computer Science or equivalent is a must. MS is preferred.

Please send resume with salary history to:

Gopi R. Jindal, Ph.D., Manager
Corporate Employment & Staffing
Sycor, Inc., 100 Phoenix Drive
Ann Arbor, Michigan 48104
(313) 995-1156

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

Sycor, Inc.

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PROGRAMMERS

Los Angeles County's Data Processing Department has career opportunities for programmers working on major teleprocessing applications for IBM 370—158's and Univac 1100—40's, using IMS and DMS 1100 data base management software. The Department has the largest Univac installation and one of the largest IBM installations west of the Mississippi. Systems development and maintenance opportunities include large scale on-line applications in health, welfare, law enforcement, fiscal and engineering.

EDP ASSISTANT PROGRAMMER ANALYSTS

$1,182 mo. to start

These positions require: One year's experience in computer programming using Common Business Oriented Language (COBOL) or Basic Assembler Language, within the last three years, for medium-to-large scale third generation computers —OR — graduation from an accredited college, within the last three years, with a Bachelor of Science degree in a field closely related to electronic data processing.

EDP PROGRAMMER ANALYST I's

$1,415 mo. to start

These positions require: Two year's experience in computer programming, utilizing Common Business Oriented Language (COBOL) or Basic Assembler Language, within the last three years, for medium-to-large scale third generation computers.

Please apply in person to:

Personnel Office (Room PO4)
Data Processing Department
9150 East Imperial Highway
Downey, California 90242
(213) 923-7721 Ext. 2936

DPD

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To participate, you MUST register. Call Cybersearch any weekday 9 A.M.-9 P.M. Out-of-towners call for interviews. For reasons of confidentiality, if your current employer is an attending company, we will notify you immediately.

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TANDEM COMPUTERS is actively seeking experienced customer engineers for New York, Washington, D.C., Miami/Tampa, Atlanta, Chicago, St. Louis, Omaha, Dallas, Denver, Phoenix, Los Angeles, and Toronto, Canada locations.

Successful candidates will be mature, self-motivating individuals who have a software background and at least five years of demonstrable experience in identifying, isolating, and repairing system malfunctions.

Daily work involves the total responsibility for and travel to customer installations for preventive and corrective maintenance procedures on all aspects of the entire system and associated peripherals. This responsibility includes the installation and testing of both upgraded and new software and hardware products.

TANDEM is a young, growing company specializing in multi-processor systems which run non-stop in a wide variety of critical applications where continued operation and data integrity is of utmost importance.

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Mr. Jerry Everett
Customer Engineering Manager
Tandem Computers Inc.
20605 Valley Green Drive
Cupertino, Ca. 95014

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Systems Programmers

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☐ **VM/370-CMS Development:**

Requires experience in most of the following areas:
- IBM/370 Assembly Language
- VM/370-CMS
- Large System Development or Maintenance
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- Project Leadership

☐ **APL Development:**

Requires experience in most of the following areas:
- IBM APL Internals
- Large System Development or Maintenance
- Knowledge of VM/370 helpful
- Minimum of 3 years' relevant programming experience required, some college preferred.

If you are qualified, send your resume with salary history, referencing this ad, in confidence to: Personnel Department, TYMSHARE INC. 20705 Valley Green Drive, Cupertino, California 95014. An equal opportunity employer m/f.

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Background in digital electronics required.

We offer an excellent starting salary and a comprehensive benefit program.

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Tech-Ed Services
10011 Rhode Island Ave.
College Park, Md. 20740
(Agency)

PROGRAMMER ANALYST SYSTEMS ANALYST

Outstanding opportunity to join our progressive organization. These positions are available at the home office of BLUE CROSS BLUE SHIELD, near beautiful Chapel Hill, North Carolina. The successful candidates will have two to five years experience; exposure to on-line systems in an IMS data base environment a plus. We offer an excellent salary and benefit package. If you are interested in a career opportunity offering growth and a professional environment, please submit your resume to:

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BC/BS of N.C.
P.O. Box 2291
Durham, N.C.
27702

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SYSTEMS PROGRAMMER

THE UNIVERSITY OF TEXAS MEDICAL BRANCH AT GALVESTON has an immediate opening for an EXPERIENCED SYSTEMS PROGRAMMER. Join a progressive data processing staff of 70 persons working for the largest, oldest and most prestigious medical school in Texas. UTMB is involved in some of the most advanced research being done in the medical field today. This 1100-bed health care facility provides a constant challenge for the development of new systems. The innovative data processing department offers each employee the opportunity to develop through internal and vendor education programs. On-line, real time, health care support applications provide the backbone of the development environment. Working with a group of four, the person selected will share responsibility for development, testing, and maintenance of systems software. This is a dynamic growth environment currently moving from OS/MVT/HASP to MVS/JES2 on a four meg. 370/158. A large teleprocessing network is managed by CICS using DL/1 as the DBMS.

Candidates qualifications should include a good working knowledge of ALC and three years experience with similar systems and equipment.

The position provides excellent benefits and a salary commensurate with experience.

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Service Computation Center
The University of Texas Medical Branch
Administration Building, Suite 551
Galveston, Texas 77550
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or call (713) 765-2151.
We are an equal opportunity m/f employer

DATA PROCESSING OPPORTUNITIES

We are a major holding company located in New Orleans. New Orleans is a city with a vibrant port, number 2 in the nation and is noted for its jazz, French cuisine, seafood and Mardi Gras. The city maintains its ties with its rich heritage while concurrently functioning as a major import/export city for the nation.

As a result of an increasing demand for data processing services being generated by our own institution as well as our business clients who purchase data processing services we are looking to fill the following positions:

SENIOR SYSTEMS ANALYST

Innovative individuals thoroughly experienced in computer based system design principles, data based concepts and sound COBOL programming practices, to formulate solutions to business problems through the use of information processing systems. Responsibilities include feasibility studies, general design, development and installation. A degree, minimum 4 to 6 years experience and excellent verbal and written communication skills are necessary.

SENIOR SOFTWARE SPECIALIST

Individuals should have 3 to 4 years experience in HASP, DS/MVT, VS1, VS2 and IMS. Will be responsible for maintenance of all operating system software and providing technological guidance to data processing staff. Experience in maintaining complex IMS environment is a necessity. Degree is required.

SENIOR PROGRAMMERS

Successful candidate must possess degree in math, computer science or related field and have 4 to 5 years experience with ANS COBOL. IMS experience would be helpful.

DATA BASE ADMINISTRATOR

The successful candidate will operate in an IMS environment where the accent is on advanced technology. 3-4 years experience in IMS with a minimum of 2 years as Data Base Administrator utilizing DB/DC. Will be responsible for Data Base design as well as serving as consultant to applications development staff.

SENIOR COMPUTER OPERATORS

Individuals must possess 2-3 years experience in an D/S MVT or VS environment. Telecommunications experience via CICS or IMS would be helpful.

All responses will receive a reply. Interested parties should send a resume to:

CW Box 5126
797 Washington St.
Newton, Mass. 02160
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Growing company seeks dynamic person who is knowledgeable in:

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(609) 667-4488

RSVP SERVICES, Dept. C
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1777 Walton Road
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SYSTEMS ANALYST

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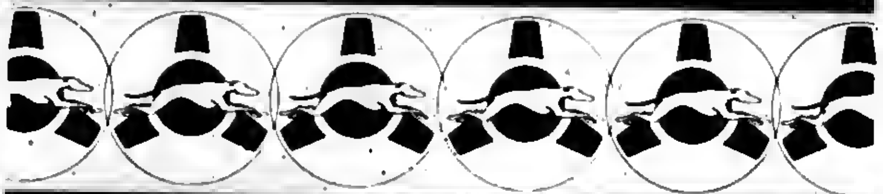

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059	$1600	$50/Mo.	402	$1000	$ 60/Mo.	602	$ 300	$ 20/Mo.
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370/135 A4 (Mod 3)	275 to 1,485	1.3 x 135	$370,000	$325,000	($45,000)
370/138 100	275 to 1,485	1.3 x 135	$435,000	$325,000	($110,000
370/145 102	203 to 315	2 x 135	$325,000	$500,000	$175,000
370/145 A3 (Mod 3)	180 to 270	2.6 x 135	$515,000	$650,000	$135,000
370/148 J	180 to 270	2.6 x 135	$800,000	$650,000	($150,000)

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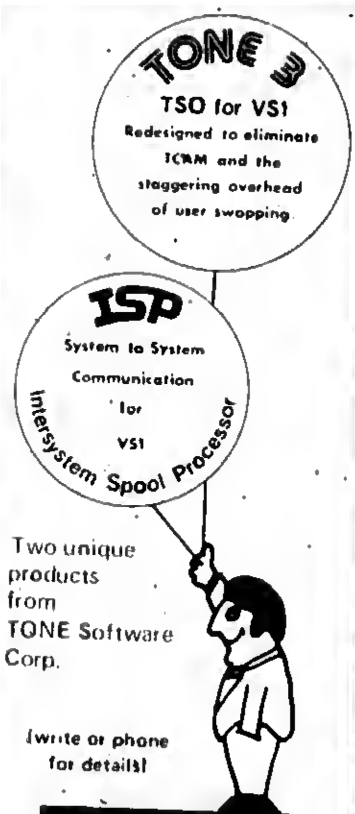
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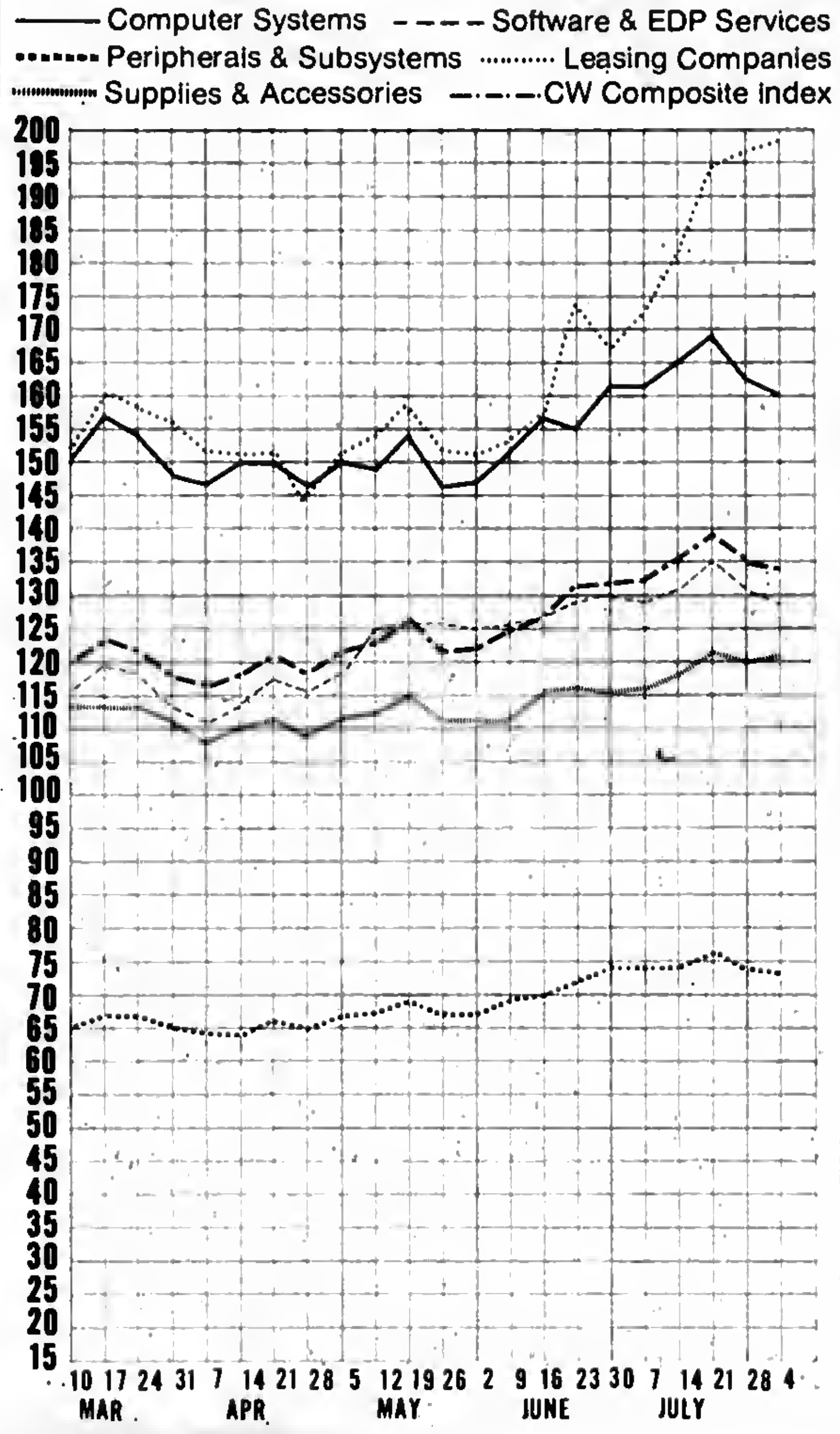

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Year Ended December 31

	1976	1975
Shr Ernd	$.25	$.10
Revenue	4,751,103	4,510,666
Earnings	221,291	86,173

CAMBRIDGE MEMORIES
Three Months Ended February 26

	1977	1976
Shr Ernd	$.16	$.03
Revenue	1,672,000	6,859,000
Tax Cred	138,000	.....
Earnings	284,000	54,000
6 Mo Shr	1.79	.....
Revenue	3,583,000	11,577,000
Spec Cred	a2,541,000	.....
Tax Cred	227,000	.....
Earnings	3,028,000	(804,000)

a-From sale of equipment previously leased to customers.

ANDERSON JACOBSON
Year Ended March 31

	1977	1976
Shr Ernd	$.45	$3.5
Revenue	20,921,000	17,342,000
Earnings	1,050,000	864,000

GENERAL DATACOMM
Three Months Ended March 31

	1977	1976
Shr Ernd	$.17	.....
Revenue	4,727,531	$4,024,981
Earnings	259,931	245,838
6 Mo Shr	.31	.....
Revenue	9,007,414	7,657,582
Earnings	469,725	354,195

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Year Ended April 30

	1977	1976
Shr Ernd	$.76	$.67
Revenue	15,114,513	14,995,944
Earnings	2,006,222	1,730,130

LITRONIX
Three Months Ended April 3

	1977	1976
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 3, 1977

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 3 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	AMDAHL CORP	0- 39	30 1/2	- 3/4	-2.3
N	BURROUGHS CORP	55- 91	66 3/4	+ 3/4	+1.1
O	COMPUTER AUTOMATION	18- 28	26 1/4	0	0.0
N	CONTROL DATA CORP	20- 26	20 5/8	- 3/8	-1.7
N	DATA GENERAL CORP	35- 50	46 3/8	+ 1/4	+0.5
N	DATAPOINT CORP	18- 30	26 1/4	- 3/8	-1.4
N	DIGITAL EQUIPMENT	37- 53	47 3/8	+1	+2.1
N	ELECTRONIC ASSOC.	2- 3	2	+ 1/8	+6.6
A	ELECTRONIC ENGINEER.	8- 10	8 5/8	- 1/8	-1.4
C	FOUR-PHASE SYSTEMS	13- 17	13 7/8	-1 1/8	-7.5
N	FOXBORO	42- 54	47 5/8	+ 1/4	+0.5
O	GENERAL AUTOMATION	6- 9	6 3/4	- 1/4	-3.5
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	78 3/4	- 1/4	-0.3
N	HONEYWELL INC	44- 59	51 1/2	+ 1/2	+0.9
N	IBM	245-286	269 3/4	+2 1/4	+0.8
O	MANAGEMENT ASSIST	5- 9	6 1/2	0	0.0
O	MEMOREX	23- 29	25 1/2	-1 1/4	-4.6
O	MICRODATA CORP	7- 18	10	+ 1/2	+5.2
O	MODULAR COMPUTER SYS	5- 8	7 1/8	- 3/8	-5.0
N	NCR	32- 44	44	+1 7/8	+4.4
O	PRIME COMPUTER INC	12- 18	16 1/4	-1 1/4	-7.1
N	PERKIN-ELMER	17- 22	19 1/2	- 1/4	-1.2
N	RAYTHEON CO	16- 33	29 7/8	+ 3/8	+1.2
N	SPERRY RAND	34- 42	35 1/4	- 1/2	-1.3
O	SYCOR INC	8- 15	10 1/8	- 1/8	-1.2
A	SYSTEMS ENG. LABS	5- 8	7	- 1/8	-1.7
N	VARIAN ASSOCIATES	15- 21	17 3/4	- 1/4	-1.3
A	WANG LABS.	10- 21	11 1/2	-7 5/8	-39.8

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 3 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	BOOTHE COURIER CORP	8- 10	10 1/8	- 1/8	-1.2
O	COMDISCO INC	10- 13	11	0	0.0
A	COMMERCE GROUP CORP	2- 2	1 3/4	- 1/4	-12.5
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.1
M	DATRONIC RENTAL	1- 2	1 1/8	0	0.0
A	DCL INC	1- 2	1 7/8	- 1/8	-6.2
N	DPF INC	6- 9	8	- 1/8	-1.5
N	ITEL	13- 20	18	- 1/8	-0.6
N	LEASCO CORP	19- 27	25 1/8	- 7/8	-3.3
O	LEASPAC CORP	1- 2	1 1/4	+ 1/4	+25.0
O	MPG INC	0- 0	1/4	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	- 1/8	-2.1
N	U.S. LEASING	10- 15	14 7/8	+ 3/8	+2.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 3 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	- 1/8	-12.5
O	ANACOMP INC	7- 10	9 1/4	- 1/8	-1.3
A	APPLIED DATA RES.	5- 10	8 5/8	- 1/2	-5.4
N	AUTOMATIC DATA PROC	23- 30	27 3/8	- 7/8	-3.0
C	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	10	- 1/4	-2.4
O	COMP ELECTION SYSTMS	6- 9	9 3/8	+ 1/8	+1.3
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	7	+ 3/8	+5.6
N	COMPUTER SCIENCES	7- 9	8	+ 3/8	+4.9
C	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMSHARE	5- 7	6	0	0.0
O	DATA DIMENSIONS INC	3- 5	3 1/8	0	0.0
O	DATATAB	1- 2	1 7/8	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17 3/4	- 7/8	-4.6
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	4 3/8	0	0.0
C	KEYDATA CORP	2- 3	1 3/4	- 1/8	-6.6
A	LOGICON	7- 17	12 5/8	- 1/2	-3.8
A	MANAGEMENT DATA	1- 2	1 5/8	+ 1/8	+8.3
A	NATIONAL CSS INC	19- 25	22 1/4	- 1/2	-2.1
O	NATIONAL DATA CORP	4- 7	5 5/8	- 1/4	-4.2
A	ON LINE SYSTEMS INC	17- 22	17 1/4	-2 1/4	-11.5
N	PLANNING RESEARCH	3- 6	5 1/8	- 1/8	-2.3
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	2- 3	2 1/4	- 1/8	-5.2
C	REYNOLDS & REYNOLDS	17- 20	18	-1	-5.2
O	SCIENTIFIC COMPUTERS	1- 3	3	- 1/4	-7.6
O	TYMSHARE INC	14- 23	20 1/2	- 3/4	-3.5
A	UPS SYSTEMS	4- 5	4 1/4	+ 1/8	+3.0
N	WYLY CORP	1- 2	1 3/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 3 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	12 1/2	-1	-7.4
O	ADVANCED MEMORY SYS	7- 9	7 1/2	- 5/8	-7.6
N	AMPEX CORP	8- 11	9 1/2	- 3/8	-3.7
O	ANDERSON JACOBSON	3- 5	4 1/8	- 1/8	-2.5
N	APPLIED DIG DATA SYS	10- 16	14 1/8	+ 7/8	+6.6
O	BEEHIVE INT'L	8- 12	8 3/4	- 1/2	-5.4
A	BOLT,BERANEK & NEW	7- 8	8	+ 1/4	+3.2
N	BUNKER-RAMO	8- 12	11 5/8	+ 3/4	+6.8
A	CALCOMP	3- 5	2 3/4	0	0.0
O	CAMBRIDGE MEMORIES	1- 3	2 3/8	- 1/4	-9.5
N	CENTRONICS DATA COMP	22- 29	26 1/8	- 1/8	-0.4
O	COGNITRONICS	1- 1	1/2	0	0.0
O	COMPUTER COMMUN.	5- 6	6	- 1/4	-4.0
O	COMPUTER CONSOLES	4- 7	4 3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2 7/8	- 1/8	-4.1
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
O	COMTEN	9- 13	10 5/8	- 1/8	-1.1
N	CONRAC CORP	19- 28	21 5/8	- 1/4	-1.1
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
C	DATA 100	6- 9	7 3/8	- 1/8	-1.6
A	DATA PRODUCTS CORP	9- 15	14	- 3/8	-2.6
O	DATA TECHNOLOGY	3- 4	4	0	0.0
C	DATUM INC	1- 2	1 3/4	+ 1/8	+7.6
O	DECISION DATA COMPUT	2- 3	2 1/4	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	3 5/8	- 1/8	-3.3
O	FABRI-TEK	1- 2	1	-	-5.9
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/8	-10.0
N	HAZELTINE CORP	9- 12	9 7/8	- 7/8	-8.7
N	HARRIS CORP	28- 39	33 3/8	-2 3/8	-6.6
A	INCOTERM CORP	10- 15	10 1/2	+ 1/4	+2.4
O	INFOREX INC	4- 7	4 1/2	- 1/8	-2.7
O	INFORMATION INTL INC	9- 14	9 3/4	+ 1/4	+2.6
O	INTEL CORP	38- 57	48 1/2	-2	-3.9
A	LUNDY ELECTRONICS	3- 6	4 7/8	- 1/4	-4.8
O	MSI DATA CORP	6- 10	9 5/8	0	0.0
N	MOHAWK DATA SCI	5- 8	5 3/4	- 1/8	-2.1
O	PENRIL CORP	2- 5	4	- 1/2	-11.1
A	PERTEC CORP	7- 9	7 1/2	- 1/2	-6.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
C	QUANTOR CORP	4- 5	4	0	0.0
O	RECOGNITION EQUIP	6- 10	9 1/2	0	0.0
O	SCAN DATA	1- 2	1 1/2	+ 1/8	+9.0
O	STORAGE TECHNOLOGY	10- 15	13 3/8	+ 1/8	+0.9
C	T BAR INC	7- 12	11 1/2	- 1/8	-1.0
C	TALLY CORP.	4- 6	3 1/2	- 1/8	-3.4
A	TEC INC	7- 10	7 3/4	- 3/8	-4.6
N	TEKTRONIX INC	29- 37	33 7/8	-1 1/8	-3.2
N	TELEX	2- 3	2 3/4	+ 1/8	+4.7
O	WILTEK INC	1- 1	3/4	+ 1/8	+20.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 3 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 7/8	0	0.0
A	BARRY WRIGHT	10- 14	13 1/2	+ 1/2	+3.8
C	CYBERMATICS INC	1- 1	7/8	+ 1/8	+16.6
O	DUPLEX PRODUCTS INC	14- 19	17 5/8	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	6 1/8	0	0.0
O	GRAHAM MAGNETICS	11- 16	16 1/4	+ 1/4	+1.5
C	GRAPHIC CONTROLS	15- 18	16 1/2	- 1/2	-2.9
N	3M COMPANY	48- 56	50 1/8	+ 1/2	+1.0
O	MOORE CORP LTD	26- 27	26 1/4	0	0.0
N	NASHUA CORP	16- 25	22 1/4	+ 1/2	+2.2
C	STANDARD REGISTER	19- 25	21 3/4	- 1/4	-1.1
O	TAB PRODUCTS CO	13- 19	17 1/4	- 1/2	-2.8
N	UARCO	19- 22	20 3/4	0	0.0
A	WABASH MAGNETICS	10- 15	12 5/8	0	0.0
N	WALLACE BUS FORMS	17- 21	19 1/4	+ 1/8	+0.6

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Koreans Hit in Theft Of Millions in GI Gear

By Edith Holmes
CW Staff

WASHINGTON, D.C. – A Retired U.S. Army officer charged here recently that South Koreans, with the help of Americans and a computer system, have been stealing up to $17 million in U.S. food, uniforms, vehicle parts and other supplies each year since the early 1970s.

The diversion of American supplies continues today "at the same or slightly reduced level," Lindsay L. Baird Jr., a retired lieutenant colonel who served a year as provost marshal for the Army's Second Infantry Division in Korea, said in a letter to the Senate's Committee on Government Operations.

In response to the publication of Baird's five-page letter in *The New York Times*, the Department of Defense (DOD) elaborated on its mid-July comment that it was "investigating alleged improprieties in South Korea."

DOD's overall inquiry will include an examination of Baird's charges, a DOD spokesman added last week.

According to Baird, Korean organized crime, the Korean military and Korean contractors, politicians and police – as well as American enlisted men – had a hand in the manipulation of the U.S. Army's inventory control, centered at Taegu, Korea.

Koreans Used U.S. System

South Koreans used the Army's logistics system, which runs on a Univac 7060, to order, move and store at convenient locations items earmarked for theft, Baird said in his letter and in an interview with the *Times*. When the property was stolen, records of its existence vanished.

Food was stolen every Monday, Wednesday and Friday and, in one instance, $103,000 worth of field uniforms was diverted, the former provost marshal reported.

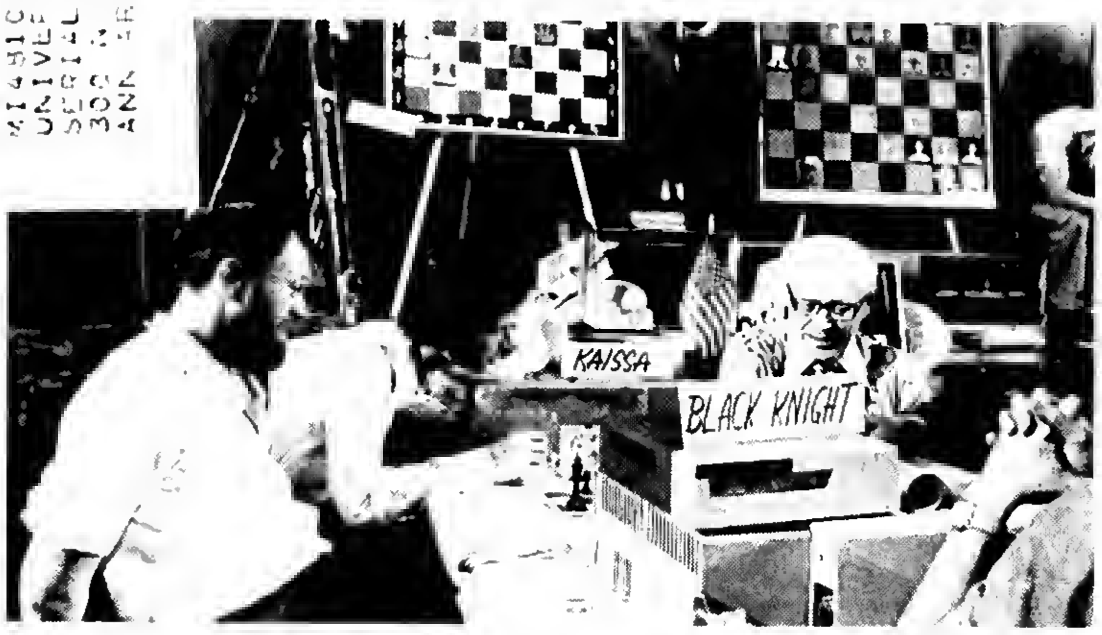
The Korean railroad billed the Army for goods that had not actually been transported or for materials that had been moved but not recorded on bills of lading because they were "destined to be stolen at the final destination," Baird said.

Baird, who retired from the Army in 1973, served as provost marshal for the Second Infantry Division from mid-1971 to mid-1972. He was in charge of a larceny squad that looked into theft and corruption in Korea.

The Army has investigated the matter in the past, he stated. In late 1971, a meeting of top Army officials put U.S. supply losses in Korea at $27 million to $28 million a year, he added.

Control procedures were established and more Americans were assigned to the Taegu computer center, he said. The Taegu operation, however, was "primarily staffed with Koreans who

(Continued on Page 4)



CW Photo by R. Frank

CW Photo by M. Upton

Some played games as others crowded into technical sessions at the International Federation for Information Processing Congress 77 in Toronto last week. In top photo, play proceeded as 16 teams contended for the computer chess crown.

Ifip Congress Draws Global Crowd

Toronto Trip Real Challenge

By Molly Upton
CW Staff

TORONTO – Getting here was half the fun.

Ingenuity and perseverance were the two traits required by many attendees of the International Federation for Information Processing's (Ifip) Congress 77 as an air traffic controllers' strike closed all Canadian airports the day before the conference started.

Attendees could be divided into two classes: those who had problems traveling to Toronto and those who didn't.

And then there were those who didn't arrive at all. The Ifip organizing committee indicated there were about 200 persons who had preregistered but not arrived as of last Wednesday.

The conference proceeded largely as scheduled, with only a few papers assigned a later time for presentation.

Although many of the attendees from Europe were already in North America before the strike began a week ago Sunday, some still had to exercise their ingenuity to reach Toronto. Those who learned of the strike while in transit faced nightmarish reroutings involving trips of up to 35 hours.

Hans Kristia Eckhoff of Rogalandsdata AS in Stavanger, Norway, said he

(Continued on Page 6)

50 Nations Represented

By Ronald A. Frank
CW Staff

TORONTO – The sixth triennial congress of the International Federation for Information Processing (Ifip) here last week attracted about 9,000 DP professionals from all over the world.

Delegates from more than 50 countries attended the technical program, which included 100 papers, 90 sessions and 30 mini symposia and panel discussions. More than 20 international authorities on computing presented invited papers as part of the technical program.

The Congress 77 exhibition featured over 100 companies, research agencies and other DP organizations displaying their products and services. Congress 77 also included the Second International Medinfo Conference dealing with the use of computing and medicine and the second world computer chess championship tournament.

The Ifip Congress in Toronto marked the second time the international conference, founded in 1962, has been held in North America; the first was held in New York in 1965.

Social issues received considerable attention at the conference late in the

(Continued on Page 6)

Controls Urged On Technology

By Nancy French
CW Staff

TORONTO – Computers are the engines of social, economic and industrial change because of the potential they unlock wherever they are applied, Josef Kates said here last week during opening ceremonies for the International Federation for Information Processing's (Ifip) Congress 77.

Kates, who heads the Science Council

(Continued on Page 6)

Mass. Nixes EDS Contract

By Ann Dooley
CW Staff

BOSTON – Contract negotiations between the state of Massachusetts and Electronic Data Systems (EDS) ended here last week, after Gov. Michael S. Dukakis intervened to halt the dispute over a $23 million state contract.

The contract involves a five-year facilities management agreement to reorganize and expand the Department of Administration and Finance (A&F).

The controversy erupted when it was discovered that two officials of Sci-Tek Associates, a Massachusetts firm, were on the contract selection committee at the same time Sci-Tek was working with EDS on a $1.6 million contract in Tennessee.

Dukakis called a halt to the negotiations after an advisory opinion by Attorney General Francis X. Bellotti found Sci-Tek's double role in the EDS selection and its involvement with EDS in Tennessee apparently violated state conflict-of-interest laws. The investigation was done at the request of A&F Secretary John R. Buckley, whose office conducted the selection process.

The governor said the contract to computerize the state's budgetary, accounting and payroll records is "too

(Continued on Page 5)

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But What Policy?

Lance: OTP to Retain Policy Role

By Edith Holmes
CW Staff

WASHINGTON, D.C. – The Office of Telecommunications Policy (OTP) will continue to have a role in telecommunications "policy development" after it moves out of the White House and into the commerce department under President Carter's federal reorganization plan, Bert Lance, director of the Office of Management and Budget (OMB), said at hearings here recently.

But Lance did not specify what areas that policy development would cover, and that left Capitol Hill observers divided on the import of his statement.

Some felt Lance meant OTP will continue to provide policy guidance in the same areas it has in the past – the structure of the communications industry, regulatory policy regarding common carriers and regulatory approaches to new technologies.

Others, including Sen. Ernest Hollings (D-S.C.), and Rep. Lionel Van Deerlin (D-Calif.) – believe Lance's remarks supporting "Reorganization Plan No. 1" contained no positive statement of the functions OTP will perform under an Assistant Secretary for Communications and Information in the Commerce Department.

Shouldn't Worry

Informal Meetings between the White House and Congress suggest the Senate Subcommittee on Communications, chaired by Hollings, shouldn't worry about the continued importance attached to OTP, communications and information policy, a subcommittee spokeswoman said.

"But we're still waiting to see something on paper from the White House," she added.

One reason Lance gave for moving OTP from the White House to Commerce was considered both "ominous" and vague by at least one observer. "The functions of OTP are important, but, as presently performed, do not require Presidential attention," the OMB director stated.

Appearing before the House Government Operations Committee's Subcommittee on Legislation and National Security earlier this month, Lance repeated the President's statement that, with the exception of the federal government's procurement of telecommunications facilities and services, agency squabbles over allocations of the radio spectrum and policy options requiring Presidential decisions, OTP will take "all other functions" with it to the Commerce Department.

Those "other functions" include communications "policy development and the allocation and regulation of frequency assignments," he said.

OTP's Origins

OTP came into being with former President Nixon's 1970 reorganization plan and had its functions specified in Executive Order 11556 of Sept. 4, 1970. The U.S. Government Manual describes OTP's functions from that point on as developing policy in such areas as communications industry structure; communications goals in international negotiations; common carrier services; and new technologies, including satellites, cable television and interconnection of computer systems.

Optimistic observers believe Lance's reference to "other functions" in his presentation to the House subcommittee, chaired by Rep. Jack Brooks (D-Texas), suggested OTP will continue to carry out these tasks as part of Commerce.

They also expect the telecommunications organization will still establish policies and standards for federal communications systems and guide the government's research and development efforts in this area, as discussed in the federal manual.

The President had already stated that under an Assistant Secretary for Communications and Information in the Commerce Department, the reorganized OTP would continue as the Administration's spokesman on telecommunications and would still assess the economic consequences of "information policy" [CW, July 25].

Lance confirmed that Assistant Secretary position will be a new post, separate from Commerce's Assistant Secretary for Science and Technology. He also stated that those OTP functions transferred to Commerce will be merged with the Department's Office of Telecommunications.

The OMB director explained that the President views the transfer of OTP responsibilities to Commerce as a consolidation of the treatment of telecommunications issues within one agency.

"The designation of a new Assistant Secretary would signal the importance of telecommunications issues within Commerce and provide a single spokesman for telecommunications issues within the Administration," he told Brooks and the subcommittee.

"Additionally, the growth of the information section of the economy, the expansion of telecommunications and DP technology and the creation of new industries in this area make it essential that economic consequences of information policy be adequately assessed," Lance said.

The transfer of OTP functions to the Commerce Department is consistent with Carter's commitment to strengthening Cabinet government, he noted.

Fianlly, Lance contended that OMB's role in computer and information system procurement makes it appropriate that the budget agency take on telecommunications procurement as well. OBM "provides a neutral home for this function," he said.

Brooks noted in his opening statement that Carter has until Sept. 15 to change or clarify his plan. Under the requirements of the Reorganization Act, which gives the President reorganization powers, Brooks has introduced House Resolution 688 expressing disapproval of Carter's first plan.

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8	**Standard Oil (Ind.)**
9	**Standard Oil (Calif.)**
10	**Texaco**
11	**Gulf Oil**
12	**Shell Oil**
13	**Sears, Roebuck**
14	**Eastman Kodak**
15	**Dow Chemical**

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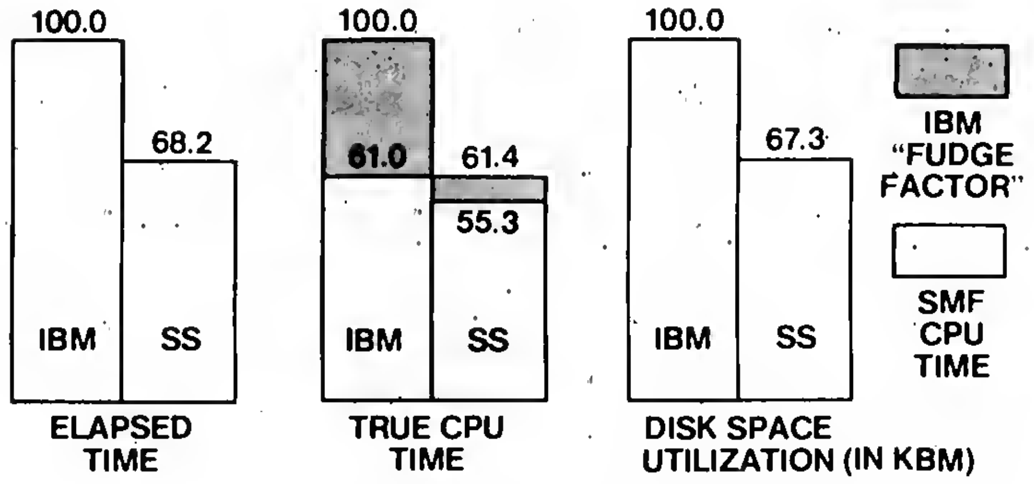

A fourteenth name on the list is going through the SyncSort testing phase right now, and any day we hope to be able to announce that we have 14 out of 15.

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Micro Programmers Seen Facing Old Problems

By Molly Upton
CW Staff

TORONTO — Programmers of microcomputers are being asked to leap backward 25 years and repeat all the mistakes of the early programmers, E. Dijkstra told the International Federation for Information Processing's (Ifip) Congress 77 here last week.

"Microcomputers are not great," Dijkstra stated at a session entitled "The Impact of Microcomputers on Computing," attended by about 800.

Just as programmers once struggled with early computers to squeeze as much as possible out of the limited-capacity machines — when "all dirty tricks were permitted," — so today's programmers of microcomputers are struggling, Dijkstra said.

Eventually programmers learned that "good taste and a systematic mind" were greater assets than the initiative to take short cuts since these traits resulted in greater reliability, he said.

Citing the "confusing nature" of computing, Dijkstra said a quarter of a century ago "we were told computers were great because they were expensive. Now we are told micros are great because they are cheap."

Dijkstra however, raised several concerns about micros, among them the problem of deciding how to distribute the computing load over a large number of processors and the problem of organizing different processors.

"With micros, users should be prepared for "very unreliable output," he said. "Even if the design is flawless, how can we convince ourselves the quality control is really there?"

He expects the chip manufacturers to adopt the same philosophy as the auto makers: Leave the quality control to the consumer. "We are forced to assume the chip is perfect unless the customer complains," he said.

Multiple Micros Urged

Dave Aspinall of Great Britain advocated the use of multiple micros in a system, but admitted it will be quite a while before supercomputer design efforts are impacted by the large-scale integration (LSI) type of device.

Rather than devising a monolithic, sequential device, designers should admit micros are cheap, use lots of them and connect them properly to achieve a solution, he said.

His analogy between a percussionist in an orchestra and a dedicated micro — "a composer doesn't worry that the percussionist is idle most of the time" — drew hearty laughter from the audience.

Anatole Holt, director of research at Massachusetts Computer Associates, explained the user's view of micro as a remarkably cheap, remarkably portable unit with substantial informational power is causing the user to want to eliminate the expensive middle person, the programmer, and use it directly.

Concern Over Standards

I. Barron of Microcomputer Analysts Ltd., chairman of the session, urged the computer industry to be very concerned with the evolving standards and architecture of microprocessors.

Although micros are "poorly designed, inefficient in their use of storage and difficult to use," the trend is toward increased use of them, he said.

Barron pointed to the "clear momentum to standardize" micros and indicated time is running short before "fossilization" sets in. "Does it matter to the computer industry what the microprocessor looks like?" he asked.

His opinion was a definitive yes, citing how the industry had become stuck with the teletypewriter, an inappropriate, slow device whose use was pervasive because of its cost.

Barron expressed fear that the semiconductor manufacturers will implement longer word lengths rather than better architectures. What is really needed is a 4- or 5-bit word length, he said.

The 8-bit word length is "very silly" and very inefficient for representing the sort of information we use — English with some numbers, he said. A more effective coding system using a character set of 4 or 5 bits could halve the cost of electronics, he added.

Citing the demand for simplicity and clarity in computing, Barron said a 30% to 40% reduction in the size of programs might be possible if one went directly to a microprocessor that accepts high-level language..

Koreans Charged in Theft

(Continued from Page 1)

were supervised by a relatively small number of Americans."

"The Koreans knew everything about the systems while our people did not," he wrote.

The Army's own logistics system facilitated the rip-off of the computerized inventory, Baird said. Under Army procedures, as goods move from one point to the next, the main responsibility for keeping records on them moves with them. The lack of comprehensive records in some other location made it easier for the crime ring to develop false records at Taegu, he explained.

In other instances, Baird said, the computer system was simply used by the Koreans as a source of information about the size, destination and contents of supply shipments.

Baird, now a DP consultant to private industry, wrote to the senate committee after it published its staff report on computer crime entitled "Problems Associated With Computer Technology in Federal Programs and Private Industry," early this year.

At the end of June, as a result of the staff study and hearings held by the Senate Government Operations Committee, Sen. Abraham A. Ribicoff (D-Conn.) introduced a computer abuse control bill designed to levy heavy prison terms and fines on criminals using computers to steal or manipulate information [CW, July 4].

A companion bill has since been introduced in the House of Representatives by Representatives Charles Rose (D-N.C.) and Robert Drinan (D-Mass.).

The Senate Government Operations Committee plans no further investigations into computer crime — including the alleged South Korean thefts — at the present time. "The investigation is already completed, and we have demonstrated a need for computer crime laws," a spokesman for Ribicoff stated.

The key issue in the Baird account of the Korean thefts is not computers, but spare parts, he continued. "That's the real scandal."

A spokesman for the Korean Embassy here said the Baird allegations were "malicious lies not worthy of further comment."

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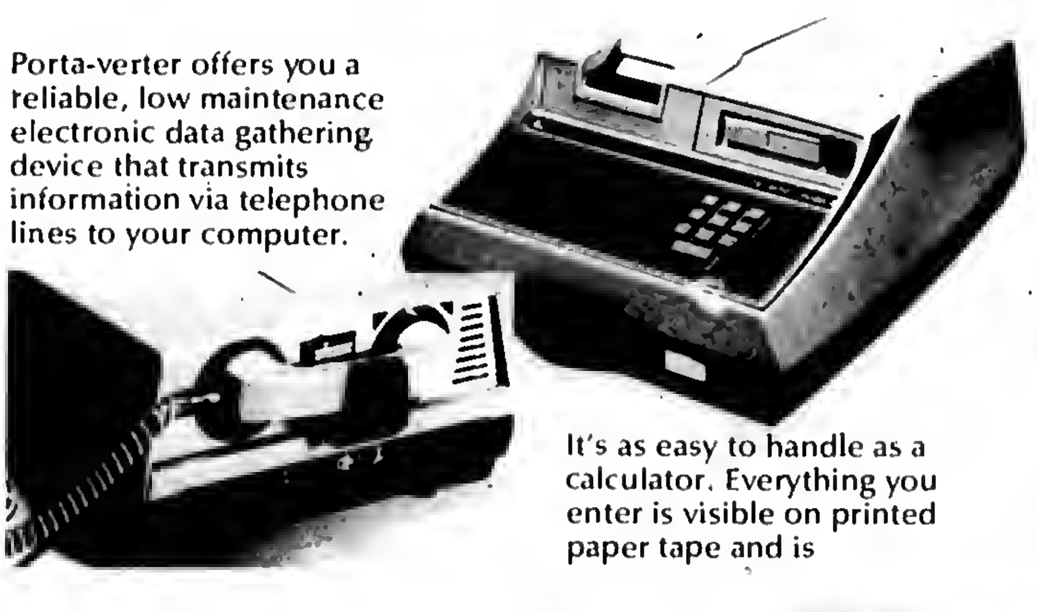

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X.25 Protocol Used

Exhibit Features International Pack Net Link

By Ronald A. Frank
CW Staff

TORONTO — The international interconnection of packet-switched communications networks was demonstrated as an operational reality here last week at the International Federation for Information Processing's (Ifip) Congress 77.

The exhibition featured a transatlantic link between the Canadian Datapac network and the French RCP net. The interconnection was implemented using the X.25 protocol recently approved by the Consultative Committee on Interactive Telephone and Telegraph (CCITT).

The demonstration was the result of a cooperative interface between the French Postel, Telephone and Telegraph (CPIT) authority, Teleglobe Canada and the computer communications group of the Trans-Canada Telephone System.

CRTs from Honeywell Information Systems, Inc., Westinghouse, General Electric and others on the exhibit floor were connected to the Datapac net elsewhere in Toronto. Messages were transmitted over the Datapac net to an X.25-compatible gateway set up by Teleglobe Canada.

From the Teleglobe interface, another gateway was established by the French PTT which also interconnected with the RCP network.

In one international connection, Derek Barber, director of the European Informatics Network (EIN), sent a message to his office in England by interfacing four major packet networks. From a CRT at the exhibition, Barber sent a message over Datapac and through the RCP net in France to an interconnection with the EIN system, which in turn was interfaced with the net of the National Physical Laboratory in Teddington, England.

CW
At Ifip

The French PTT used the transatlantic link to demonstrate the RCP net and Iria, the French research institute, demonstrated several applications on the Cyclade network, which utilizes the Cigale system as its packet-switched transmission medium.

The Cyclade applications shown at the exhibition included a chemical data bank called Thermodata running on an IBM 360/67; Santal, a data base developed with the French Red Cross to compile information about hemophiliacs; a documentation system of the European Space Agency running on a 360/65 near Rome; and the Scrapbook file management system operating on the NPL network.

CII-Honeywell Bull participated in the Cyclade demonstrations with terminals connected to its DP center in Paris, where an HIS Series 60 Level 66 was operating. The company also used the terminals at the exhibition to access Iris 80 and Iris 50 systems installed at customer sites.

The French RCP network is the forerunner of the Transpac public packet network, which is scheduled to become operational next June. The Cyclade network, which became operational in 1973, currently serves scientific, academic and research users as well as government agencies in France.

French officials said it has not yet been determined whether a permanent interconnection will exist between Cyclade and Transpac.

Governor Calls Halt to EDS Bid Award

(Continued from Page 1)

important and too big a job to be tainted by any hint of conflict-of-interest."

A further investigation by a state advisory committee is continuing to "prove or disprove the existence of substantial violations" and to "determine whether further civil or criminal proceedings" are indicated, according to Bellotti.

Although the contract is being put out for new bids, Dukakis said Sci-Tek would play "no further role." To date, however, the small firm has obtained five other separate contracts from the state amounting to more than $1 million.

James Corkery, co-owner of the firm, stated that an appearance of conflict of interest evolved because of delays in the Massachusetts contract selection process.

But the advisory committee found two of the delays occurred "because of the inability of Sci-Tek individuals to attend" selection committee meetings.

Sci-Tek official Robert Orr could not attend the final selection meeting since "he was in Memphis discussing the project there with Memphis officials and an EDS representative," according to advisory committee reports.

During the first phase of the bidding, the EDS proposal was ranked lowest technically of five bidders, according to Bellotti. The EDS bid was also $3 million higher than a proposed from Computer Sciences Corp., a competing bidder, acording to the firm.

At some time in the selection process, EDS rose from last to first place, Bellotti said.

"The substantial improvement in EDS' rating by the Massachusetts selection board following the Memphis negotiations creates, at a minimum, an appearance of improper influence. Thus, even without a further investigation, the provisions of the conflict-of-interest law appear to be violated," he said.

The two Sci-Tek officials' actions "suggest possible violations of several criminal provisions of the conflict statute," he said.

The conflict of interest could be considered illegal "as long as EDS agreed to the subcontract arrangement in order to 'reward' Sci-Tek for the favorable Massachusetts vote," the advisory said.

"It is critical to ascertain whether EDS made some commitment to Sci-Tek . . . as a quid pro quo" on the state contract, according to the advisory committee.

"Evidence of an unmerited shift in EDS' rating" would indicate a violation, according to Bellotti.

The investigation will either prove "opportunity for collusion" or "that [the Sci-Tek officials] are guilty of nothing more than poor judgment in allowing the appearance of impropriety to flourish," he said.

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Control Urged for Technology-Caused Change

(Continued from Page 1)

of Canada, a 25-member committee of university and industry representatives established to advise both government and industry, said all nations must give top priority to controlling the changes that flow from technological innovation.

It is necessary to anticipate the consequences as well as the potential of technological innovation and implementation, he said, adding that not all change is good and that today's boon may be tomorrow's disaster.

Although Kates characterized the computer revolution as "more benign" than perhaps the fast breeder reactor or recombinant DNA technology, he said it is critically important to understand the nature of the revolution that computers are creating, as well as what this means to individual countries and the world as a whole.

Computers have a bad image, he said, because people think they approach problems in a cold-blooded, calculating, mechanical way. While this view is unjustified, it does point to two important problems.

First, the public needs to be better informed about scientific developments; second, scientists and technologists have to take more seriously their responsibility to understand and to communicate to others the social, economic and philosophical implications of their discoveries, Kates said.

Computer technology is already famous for the way it can replace human workers and thus contribute to improved industrial competition, he pointed out. However, those displaced workers sometimes find themselves unemployed and on welfare, so a clever application of computer science may have added nothing at all to the human estate, according to Kates.

There also has been a tremendous development of potentially important weapons such as data banks and computer models which have not been used to combat Canada's and other countries' economic problems, he said.

The phenomena of boom and bust, stagflation, regional disparities and so on are an enigma, although the productive potential to address them does exist, he said.

"It is clear the evolving new world order will be seriously affected by the extent to which countries control or own the technological know-how on which their economies depend," he said.

The largest industrial countries are bound to develop leadership positions in the new technologies. The small and middle power countries can still compete, but in highly specialized areas, he said.

Computers have already helped Canada develop its resources and bring its population centers closer together with better communications, and computer technology can contribute much to the goal of saving energy, he said.

Some of this technology probably should be imported, but much can be improved here, too — developed for adaptation to Canadian conditions — such as the requirement for more heating and cooling, more transportation and communications and more energy for industries.

Canada is still in the process of nation-building and of creating the capability to play an effective, interdependent role in the world community. Innovations such as those in the computer field are perceived as engines of change that must contribute to this process.

The Science Council advocates "technological sovereignty" as the prescription for Canada's difficulties in ensuring an interdependent status in the global community, Kates said.

CW Photo by M Upton

Josef Kates

"Middle powers" like Canada can become more technologically interdependent by developments in software, which will lead to employment of a kind that challenges the intellectual abilities of a large portion of Canada's population.

The reduced dependence on capital investment that this involves, together with microprocessor technology and large-scale integrated circuitry, poses an exciting challenge to the large multinational companies that have so far dominated the computer industry.

Toronto Trip a Challenge

(Continued from Page 1)

and about seven other Norwegians were notified of the strike by American Airlines at their hotel in New York City.

The only flight they could get was to Rochester, N.Y., where they rented two taxis and headed for Toronto. The taxi drivers had never been further than Buffalo, so Eckhoff did the navigating.

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Dr. Filberti Fiumi of Siemens in Milan, Italy, arrived in Toronto Saturday, two days before the conference opened, and encountered no problems.

But Meczyslaw Bazewicz of the Technical University in Wroclaw, Poland, was on a plane that was diverted to New York City. He was bussed to Toronto.

The journey took 24 hours and Bazewicz arrived at 1 P.M. last Monday, after the conference had opened.

Rolf Hoyer of the University of Goteborg, Sweden, arrived in New York City a week ago, last Thursday and drove as planned to Toronto in order to see some of the countryside.

Manfred Mall of Dornier System GmbH in Friedrichshafen, W. Germany had perhaps one of the most time-consuming journeys to Ifip. He started in Copenhagen 35 hours before reaching Toronto.

In London the airport was crowded with people standing around while planes were delayed. Mall arrived in Detroit at midnight Sunday and was bussed to Toronto, arriving at 7 A.M. Monday.

Carl Page of Michigan State University said he drove, as he had planned, from East Lansing.

Harold Borko of California said his wife had difficulty obtaining a flight from NYC to Buffalo. When she did, the bus from Buffalo blew a tire.

Robert Nell of the Saskatchewan Computer Utility in Regina, Canada, heard about the pending strike the night before it happened and arranged to start his journey with a flight from Minot, N. Dakota that left at 6:20 A.M. on Sunday. He and some colleagues left Regina for Minot at midnight and arrived just in time for the plane because they had forgotten Minot's time is an hour earlier.

After a six-hour layover in Chicago, Nell arrived in Buffalo. But his problems were not over.

He boarded a very old bus which, after an hour or so of driving, headed back to Buffalo because neither the driver nor any of the passengers knew the way to Toronto. Nell arrived at his Toronto hotel at midnight Sunday, 24 hours after he started from Regina.

Ifip Pulls 9,000 From 50 Nations

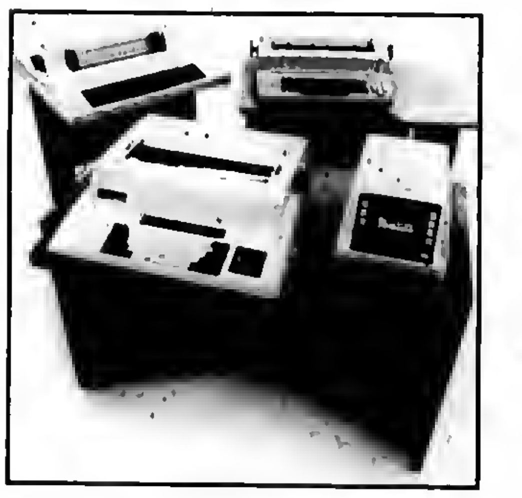
(Continued from Page 1)

week with five panel sessions covering such topics as the social accountability of computers, the impact of computerization on leisure activities and the erosion of privacy. Social issues related to computing first appeared on the Ifip program at Congress 74, held in Stockholm, Sweden.

The Congress 77 program also included a science theatre that presented movies and videotapes described as representative of the state of information processing today. The science theatre stressed the theme of Congress 77, "The Maturing Profession — Perspectives and Prospects."

Ifip is a federation of 34 national DP societies organized to promote information science and technology. During Congress 77, Pierre Bobillier of Switzerland was voted incoming Ifip president, replacing Richard Tanaka of the U.S.

Ifip Congress 80, the next meeting of the federation, will be jointly hosted by the Information Processing Society of Japan and the Australian Computer Society. Slated for October 1980, the first week of the conference will be held in Kyoto, Japan, and the second week in Melbourne, Australia.



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U.S. Team Captures Crown As World DP Chess Champ

By **Ronald A. Frank**
CW Staff

TORONTO — A U.S. chess team from Northwestern University became the new world champion last week after trouncing 15 other competitors at a tournament held as part of the International Federation for Information Processing (Ifip) Congress 77.

Playing on a Control Data Corp. Cyber 176 mainframe, programmers David Slate and Larry Atkin captured the crown with their Chess 4.6 entry.

The world chess competition began in 1974 at the Ifip Congress in Stockholm, Sweden, when the Russian program Kaissa came in first. Kaissa was written at the Institute for Systems Studies in Moscow by Dr. M.V. Donskoy and Dr. V. Arlazarov.

Opponents for these competitions are selected randomly and, for the second time in a row, Chess 4.6 and Kaissa were not matched against each other. However, the two competed in exhibition play Wednesday night, where Chess 4.6 defeated the Russian contender.

Slate

Atkin

Chess 4.6 was programmed in Assembly language and contains a program of 7.5K words plus extended storage. The program contains an opening book of 5,600 positions, and the average number of positions examined per move is said to be 400,000.

The Russian program ran on an IBM 370/168 at Canada Systems Group in Toronto. Most of the other programs ran on CPUs in Canada or the U.S., with the exception of the West German entry, Elsa, which ran on a Telefunken TR440 in Munich using a data communications link supplied by Canada's I.P. Sharp Associates.

The English program, Master, ran on a 168 at Harwell in Britain, also using a data link supplied by I.P. Sharp.

One of the smallest processors in the tournament was a Digital Equipment Corp. PDP-11 used by the Belle program written at Bell Telephone Labs in New Jersey. Amdahl Corp. 470V/6 mainframes were used by teams from the University of Alberta, University of Toronto and University of Michigan.

The only individual entry in the tournament was the BS'66'76 program written by Barend Swets of The Netherlands. Swets played on a 370/168 using machine time donated by Datacrown Ltd.

The Dutch entrant wrote his program in 1966 when he was a computer science student at Delft University, but he has not been able to afford CPU time to work on BS'66'76 between championships, he said.

Although computer chess programs have come a long way in the last few years, Swets said it is doubtful the machines will ever play better than human experts.

Chess programs are commonly rated in Elo points, Swets said and the programs like Chess 4.6 and Kaissa are currently rated at about 1,800 points.

In a few years Swets believes the programs will have a rating of about 2,000 Elo points, but this is still below the level of a Grand Master, who would be rated at about 2,500 Elo points.

The chess programs play an erratic game, Swets said, but they take on the style of play favored by their authors as well as reflecting the playing habits of their countries.

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CW Photos by R. Frank

Chess expert David Levy gives "play by play" during tournament.

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Will Ease CPU Limitations

Much Memory for Little Money Predicted Soon

By Ronald A. Frank
CW Staff

TORONTO — The time is not far off when a million words of very fast semiconductor memory will cost only a few thousand dollars, according to Prof. M.V. Wilkes, head of the computer laboratory at the University of Cambridge in England.

Speaking at an opening day session of Congress 77 sponsored by the International Federation of Information Processing (Ifip) here last week, Wilkes said today's CPUs are not short of processing power, but short of memory cycles.

This is shown by the fact that so-called multiprocessor configurations are nearly always dual-processor systems because two processors are sufficient to utilize the available memory cycles.

Additional processors may enable a higher level of fault tolerance, but they will not materially improve the throughput. In a mainframe using a large number of microprocessors, therefore, much more money would be spent on the memory than on the microprocessors themselves, Wilkes told an audience of international attendees.

Microprocessors today are ideally suited for applications where the memory requirements are not great. These include the control of industrial processes and the control of computer peripherals.

But mainframe applications of microprocessors will have to wait until the cost of higher speed semiconductor memory has fallen dramatically, he said.

There are currently four levels of memory used in computer systems, according to Wilkes, who described them as archival memory utilizing magnetic tape; file storage using moving-head disks; intermediate storage using drums or fixed-head disk; and high-speed memory using core or semiconductor technology.

The first, second and last of these levels have clear operational requirements while the intermediate storage "exists only for economic reasons." The limit of what can be handled efficiently in paging memories has been reached and even exceeded slightly with drums and fixed-head disks used for intermediate storage, he said.

CW At Ifip

CW Photo by R. Frank

M.V. Wilkes

For this reason, the development of a memory device with somewhat similar characteristics but much greater speed "would be instantly adopted by those who are dissatisfied with the performance of their paging systems." Wilkes called this area "an immediate role for bubble memories or charge-coupled devices."

We are not very far from the point at which intermediate storage will disappear altogether, he said, adding this will happen as soon as the cost of high-speed semiconductor memory becomes low enough.

When this happens, paging as it is known today "will sink without a trace," Wilkes predicted.

But a single-level, high-speed memory containing one million words or more will present new problems. Programmers will want to have some sort of segmentation and this could well take the form of mapping the memory onto itself with the methods now employed to map a drum onto a smaller high-speed memory, Wilkes said.

This type of memory would constitute paging without having to wait for the associated time penalty when material is being transferred, he added.

The user is thus within sight of the compact computer having a processing power approaching that of modern mainframes with high-speed memory. The low cost of these machines will make them useful as stand-alone CPUs or building blocks for larger systems.

Few people would say that the stand-alone machine can meet all DP requirements because a central facility is needed for the permanent and semipermanent storage of information in bulk, Wilkes said.

But sheer possessiveness could lead a user to demand a computer in his own office. Further, when a central site is down, the user can continue to do whatever work is possible.

An argument for having a central site CPU is that there is better control and maintenance. In addition, some users require a CPU only on an infrequent basis and cannot justify a computer of their own.

For these reasons, service bureaus will continue to flourish regardless of what happens to the rest of the industry, Wilkes said.

Considering the various trade-offs between a user having an in-house CPU or using a DP center, a hybrid system may evolve in which users would be given the choice, Wilkes said.

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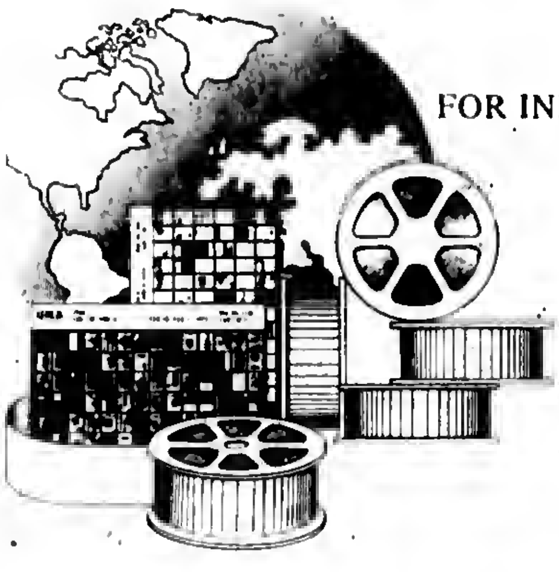

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Transnational Processing Cited as Canadian Bane

By Nancy French
CW Staff

CW Photo by M. Upton

J. Hugh Faulkner

CW At Ifip

TORONTO — The advances in teleprocessing that have enabled foreign-owned companies here to save money by processing their Canadian data outside the country have contributed to Canada's employment and balance of payments problems, according to Canada's Minister of State for Science and Technology.

Speaking at ceremonies that opened the International Federation for Information Processing (Ifip) Congress 77 here last week, J. Hugh Faulkner said the rapid advances in computer and telecommunications technology "have combined to accentuate the problems of national control of national destinies."

The importation of information processing services resulted in lost revenues of $150 million to $300 million in 1976, according to preliminary estimates developed by the Department of Communications. The rather imprecise estimates are a result of difficulties in definition as well as valuation, an aide to Faulkner explained.

Further, this practice has cost Canadians 30,000 to 40,000 jobs through either loss or lack of creation. Although these figures appeared in a draft version of Faulkner's speech, the minister deleted them for presentation.

Faulkner compared the problem to the "brain drain" of the late '40s and '50s, during which Canadian professionals educated in the government-funded university system emigrated to the U.S. and other countries where they could earn higher salaries.

Growing Dependence

The problem of transnational data flow has "created the potential of growing dependence, rather than interdependence," and with it "the danger of loss of legitimate access to vital information and the danger that industrial and social development will largely be governed by the decisions of interest groups residing in another country," Faulkner said.

Acknowledging the concern of industry over attempts to curtail the free flow of information across national borders, he also noted how costly it would be to duplicate the large data banks required by science and industry and said there would be little to gain from such duplication.

However, he emphasized, that "national borders do exist — they are a fact of life and cannot be ignored by multinational corporations. The operation of such firms in other countries cannot be regarded as mere extensions and adjuncts to headquarters, similar to branch plants in their own country of origin."

As for the importance of international trade, Faulkner said he recognized that world progress is dependent on such commerce. However, there have been only a few short years in which it has been technically and economically feasible to import or export information-processing services.

"Here we are dealing with something intangible. You can't pick it up, you can't count it as it crosses an international boundary and most of it relates to intracorporate requirements rather than to something for sale in the marketplace," he said.

"There is a growing need for international agreement on a generally acceptable set of ground rules for dealing with these perplexing problems," he said. "We are all 'developing' nations in the new information society, and solutions to these new problems cannot always be found in tradition or precedent."

Passivity Diminished

To date society has been passive in its attitude toward advancing technologies, Faulkner said, which has led to a series of events which caused continuing and usually irreversible change.

"Unforeseen problems sometimes reduced government policies to a series of reflex reactions to unforeseen crises," he explained. He warned, however, that society is "no longer passive to advances in information processing because of the growing impact on the individual and because we have on our hands a revolution rather than an evolution."

As information is increasingly processed and stored remote from its place of origin, new approaches — nationally and internationally — will be needed if responsible jurisdictions are to protect the privacy of their citizens and ensure the right of their citizens to access all the information that should be available to them, he said.

Finally, Faulkner urged attendees to work to improve the relationship between computers and the man on the street.

Today the citizen gets little assistance when it comes to dealing with computers that send "dunning notices for payments of disputed charges and predated bills which arrive after the overdue date," for example. He blamed these problems on a "lack of acceptable standards to guide interactions between people and machines."

Faulkner praised the Canadian Information Processing Society for establishing an ombudsman service which provides a flexible and appropriate response to such complaints.

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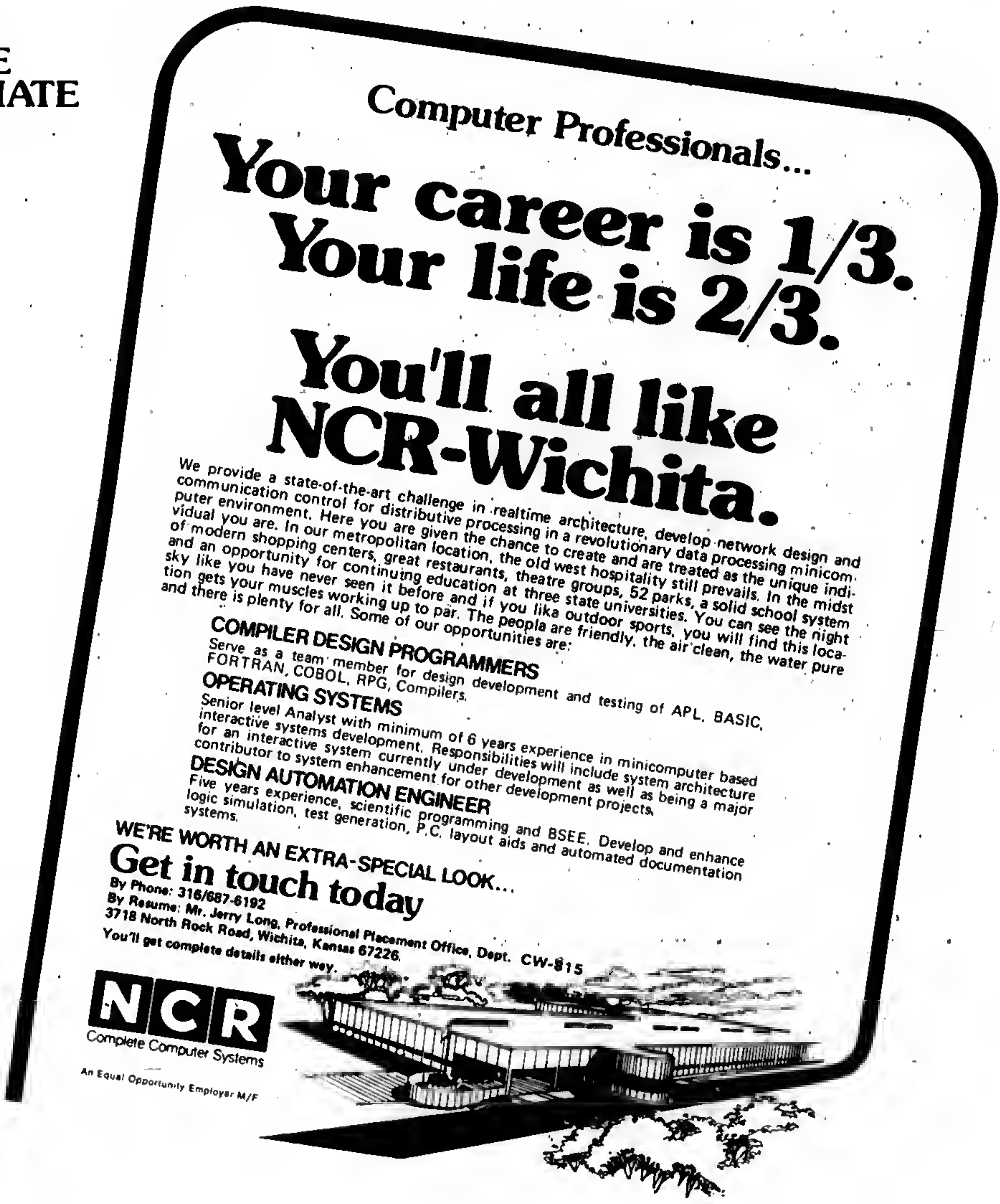

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In Position Paper

DPMA Rejects Software Taxation

PARK RIDGE, Ill.— The Data Processing Management Association (DPMA) has issued a position paper calling software an intangible personal service that should be accorded the same treatment under the law as services by other professions.

The position paper was issued in preparation for the society's coming campaign against software taxation.

The paper cited the definition issued by the Tennessee Supreme Court Commerce Union Bank vs. George Tidwell.

Software is "information and directions loaded into the machine which dictates different functions for the machine to perform. What triggers these functions are referred to broadly as 'programs' and are often accompanied by magnetic tapes and disks, punch cards, manuals, flow charts and expert engineering assistance to comprise what is known in the industry as computer software," the court stated.

The DPMA paper pointed out that any tangible property, if used, is an inconsequential element of intangible software because:

- "Said software may be entered into a computer directly or via telephone lines with no tangible personal property, with the identical result as if tangible property were used as the input communications medium."
- "Such communications media are merely intermediate input means of entering software into a computer on a one-time basis before it is transformed into its intangible end state of binary pulses."
- Said tangible property, if any, is either destroyed or reused after being used to transfer the intangible information therein to the computer on a one-time basis, leaving instructions (program) and information (data) in the computer in the form of binary pulses as the intangible end state."
- "The value of said tangible property, if any, is small, 5% or less, in comparison to the value of said intangible software."
- "Any tangible property, if used, has virtually no value in itself. Any value is in the information, which is valuable only when read by the computer and transformed by the computer into its tangible end state of binary pulses."

IBM Division Plans Solar Heat

AUSTIN, Texas — IBM's Office Products Division is planning to install a solar-powered water-heating system at its development and manufacturing facility here.

"The solar-powered water-heating system, used in conjunction with IBM's computer-based Energy Management System, is expected to reduce our dependency on natural gas for boiler fuel by approximately 60%," according to Tom Backus, general manager.

The solar system is expected to be in operation by this fall.

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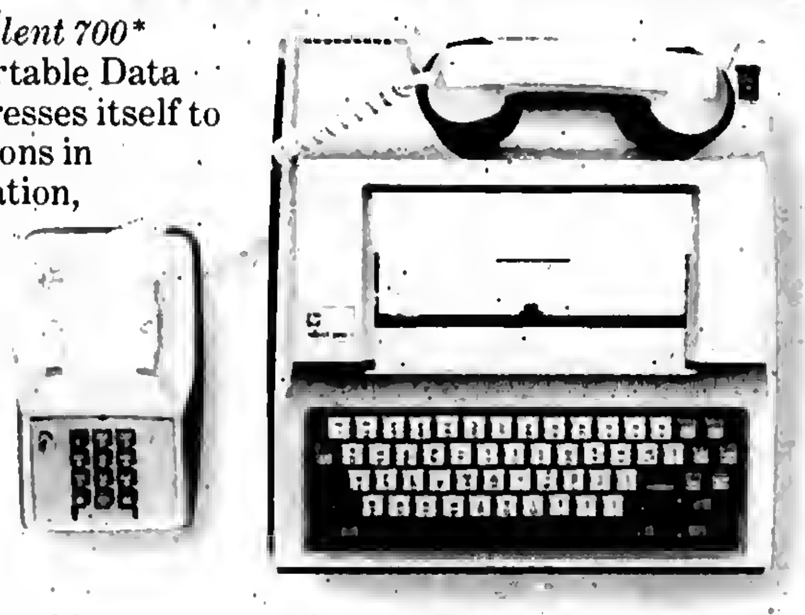

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TEXAS INSTRUMENTS.

Although Financial Systems Strong

DP Donation to Patients' Care Called Small

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Although computer technology has greatly improved patient billing, it has yet to contribute significantly to patient care, according to W. James Prowse, a partner with Touche, Ross & Co.

Addressing an OCR Users Association conference here recently, Prowse said there have been several highly technical computer applications to serve patient needs, but "most of the computing in the U.S. health care system today is concerned with hospital payroll and with the myriad artificial complexities of billing, accounts receivable and insurance claims processing."

The "silver bullet" that some physicians believe DP can be in the direct care of patients is a long way away, given the funding that research in this area receives — or doesn't receive, Prowse added.

Because funding for DP research in hospitals and similar health institutions tends to be spent on financial applications, Prowse believes it unlikely these organizations will pioneer any real progress in computers and patient care.

Sophisticated Payroll

Many hospitals have sophisticated financial management systems which include programs for payroll, billing, accounts receivable, inventory control and general ledger maintenance. Accounts payable is a minor application in most hospitals, he said.

Those institutions with foresight are also using their financial systems to do cost accounting in an effort to understand what their costs actually are, Prowse said, noting this is "a very difficult area."

Not much has been done in hospitals in computerized operations management, he continued. Admission, discharge and census of patients as well as outpatient and emergency room registration may be automated, but usually support the billing and accounts receivable applications.

Some institutions have spent millions of dollars to automate the scheduling of hospital admissions, outpatient visits, operating rooms and plant and equipment maintenance, Prowse noted. So far, however, this application hasn't proved cost-effective; the hospital might as well have a person arranging the schedules for these tasks, he said.

Applications in patient care are interesting in themselves as well as in what they haven't achieved, Prowse said. Next to billing and accounting applications, computers have been used to the greatest extent in acquiring data on patients for analysis in a hospital's clinical labs, he stated.

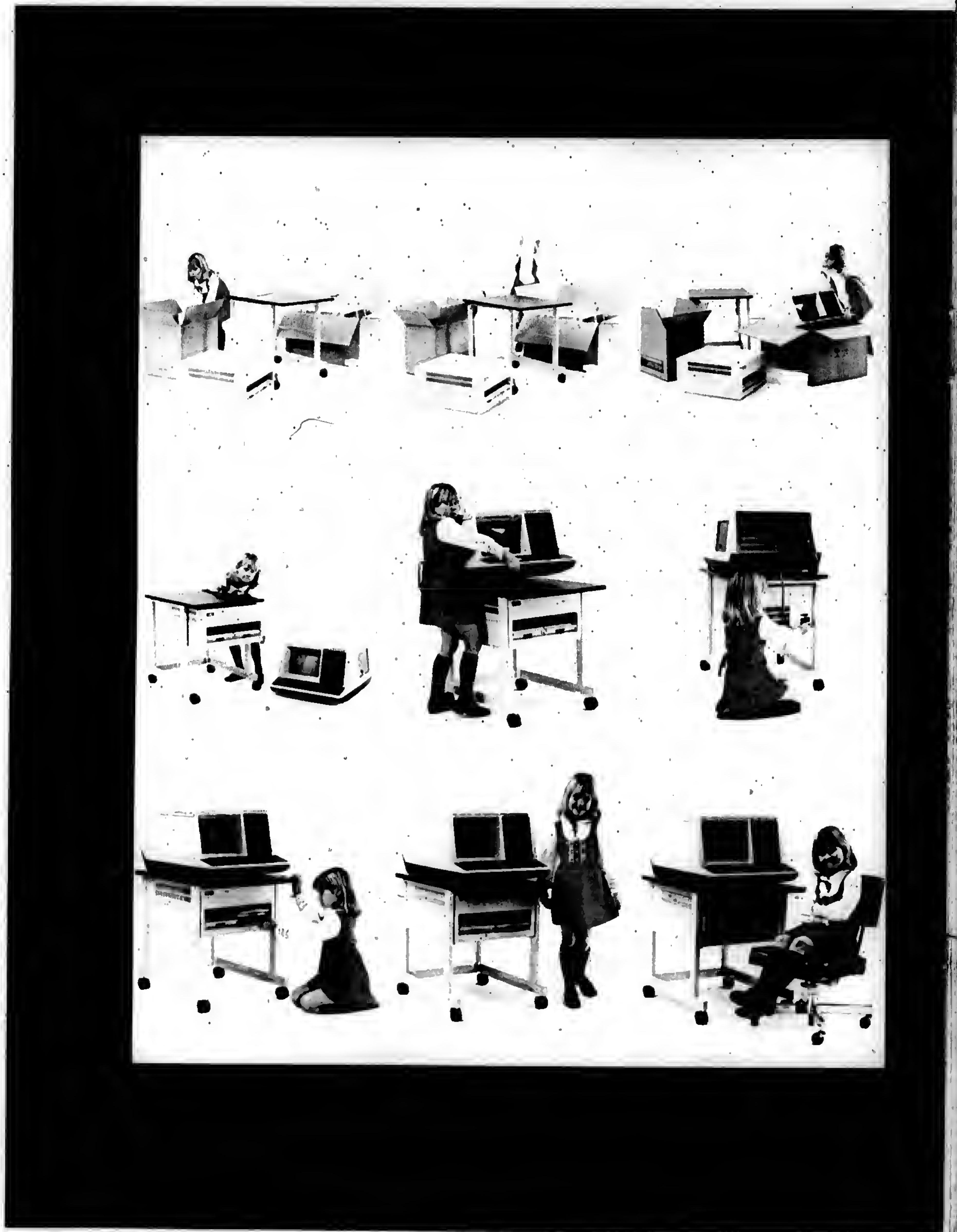
In the data acquisition area, analog outputs for devices attached to the patient are converted to digital signals that can be analyzed by computer. Minicomptuers play a large role in these "Rube Goldberg-type devices," Prowse said.

Minis have made great strides in analyzing data in areas like biochemistry, hematology and physical medicine, he added. Reports from these systems can improve a hospital's quality assurance program and get the necessary information to the physician who is treating the patient.

Other applications in the area of diagnosis of patient ills include computer-assisted diagnosis, diagnostic radiology report input and computer-assisted organ imaging. Chiefly research funded, these applications tend to be on-line through time-shared terminals, Prowse said.

Automated radiology reports have been designed to handle routine test results, for example, a negative chest X-ray. The area receiving more attention at the present time, however, is organ imaging, which requires a computer to produce images of a person's internal organs in readable form, Prowse explained.

(Continued on Page 15)



Prowse: Hospitals Giving Birth to Mini Boom

By Edith Holmes
CW Staff

WASHINGTON, D.C. — What does the future hold for the use of computers in health care?

More minicomputers everywhere, according to W. James Prowse, a partner with Touch, Ross & Co.

So far, minis are best suited to the needs of a variety of clinical applications, and more doctors will be able to come up with the dollars needed to purchase these machines, Prowse told the OCR Users Association at a recent conference here that attracted over 300 people.

The proliferation of minis through the hospital or institutional health care setting will also make it harder on the managers of centralized DP shops to manage the computing going on in these organizations, he added.

In addition to predicting that minis will become more widespread in health care, Prowse expressed his belief that hospital information systems as a whole will become cost-effective.

Forcing this trend will be cheaper equipment as well as medical personnel who are less afraid to use these machines, thus eliminating the DP people who now provide the interface between doctors and terminals, Prowse said.

There will also be more machine-to-machine billing, employing optical character recognition (OCR) as an interim step, he suggested. With the proliferation of minis in hospitals, Prowse contended insurance companies will take tapes and disks directly from these processors to do their own DP.

If national health insurance ever comes about — and Prowse emphasized "if" — hospital computers will be released to perform more interesting tasks than the billing applications that consume all their time now. National health insurance would diminish the hospital's need to unravel the complexities of third-party billing that exist now, he added.

The health care business will see an opportunity to develop a national citizen medical record with impacts on patient care, public health and health service, he stated.

The development of such a medical record, however, would carry with it "mind-boggling problems of confidentiality and security," Prowse said.

Contribution Called Small

(Continued from Page 14)

All of these applications present something of a crisis for the hospital's DP department, which over the years has moved from a machine like an IBM 360 to an IBM 370. What does such a department do with all the organ imaging equipment that comes along? How does it handle the radiologist who suddenly wants a compiler of his own?

There are other application areas with which the DP department must now contend. Radiotherapy treatment planning — a technique designed to destroy a tumor — is a minicomputer-based, highly computational application.

The technique is difficult to perform with a time-sharing system; a hospital needs about $60,000 worth of minis and peripherals for a system that isn't in use all the time, Prowse noted.

Blood banking is the solid patient treatment application on the books right now. A proven computer application to a medical problem, blood banks can be maintained on any kind of system, including traditional batch, Prowse said.

Computerized in-patient treatment includes the automated capture of a physician's orders and their transmission to various elements of the hospital, order editing of conflicting physician directions, computer-assisted preparation of nursing care plans, the transmission of some test results to nursing stations and computer-assisted preparation of patient management guidelines, he stated.

Monitoring of patients in the intensive care unit requires a minicomputer, which can be obtained off-the-shelf these days and simply substitutes for a nurse, Prowse added.

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Editorials

A Comforting Thought

The use of computers in a society can be as useful or as esoteric as that society chooses to make it.

That not-so-startling idea is vividly emphasized in a recent *Time* magazine article that contrasted computer usage in the U.S. and the USSR.

According to an unnamed "Western cybernetics expert in Moscow," Americans have dealings "linked with a computer at least 10 times a day" while the average Russian comes in contact with a CPU "perhaps once every six months."

The article did not identify the expert who made this value judgment, nor did it explain how the expert compiled the statistics.

Nevertheless, the comment illustrates the basic contrast between computer use in the U.S. and the Soviet Union. Computer abuse and many of the problems that have been created in this country related to personal privacy are a direct result of the pervasive manner in which this society utilizes DP power.

The computer has been used in many ways to make life simpler and easier. The alternative approach is the one adopted in Russia, where the average person is rarely affected by computer systems.

It is true that problems and potential abuses come with the U.S. approach, but somehow it is more comforting to live with these problems, trying to solve them, than it is to keep the computer out of reach of the public.

Bad Planning

There will be two microcomputing shows on the East Coast during the fourth week of August: Personal Computing '77 in Atlantic City, N.J., and Computermania in Boston.

While it is important to have shows in different parts of the country to reach the hobbyists who don't have the benefit of expense accounts, the thought of two significant shows being held during the same time frame is disturbing.

The microcomputing industry is a young one, and both the users and manufacturers are experiencing growing pains. Much of the marketing sophistication and polish that the IBMs, CDCs and NCRs have is nonexistent in the micro marketplace.

Also lacking is the hard cash to support multiple show locations. Companies that have just outgrown their infancy and are beginning to establish themselves with some degree of stability in a vibrant marketplace cannot afford to miss a single show — but they can't afford to cover concurrent shows, either.

The user is also hurt by the conflicting show dates, for just as every vendor may not be able to exhibit at every show, the idea of coughing up hard cash to visit a show with fewer than anticipated vendors is a hard one to swallow.

The shows themselves are bound to get hurt. When the users and manufacturers recognize they are not getting full value for their money, they will undoubtedly seek other means of getting in touch with each other.

These conflicts in show dates are unhealthy for everyone concerned. It doesn't matter whose fault it is and it's unimportant what the underlying reasons are; what it comes down to is that such scheduling conflicts as the Boston/Atlantic City one show a degree of immaturity that casts a shadow on the entire industry.

Let's hope that clearer thinking guides the scheduling of future shows.

Letters to the Editor

Person First, DPer Second

Jack Stone's Aug. 8 column ["DPers 'Disconnected' From Family Life?"] certainly raised some provocative questions. In my opinion, however, the main problem lies with the attitude expressed by Stone and Painter Hoffman and, apparently, by others too.

I do not consider myself a "computer person." I am a person who happens to work with computers.

Once one starts thinking of oneself as a "blank person," with the blank being "computer," "doctor," "lawyer," "Indian chief," or whatever, it is natually the "blank" that becomes the important title; the person part of it is subordinated.

Perhaps the best solution to the problem of dehuminization is for us all to think, act and refer to ourselves as people first and as DPers second, if at all.

David A. Schlesinger
New London, Conn.

Story Sensationalistic

I read with considerable dismay "CRTs Cause of Editors' Cataracts?" [CW, Aug. 1]. This article was a disgrace both regarding its implications on an important segment of the computer industry and in its overall lowering of *Computerworld*'s, editorial standards.

During the last 15 years, hundreds of thousands of CRT terminals have been shipped to users all over the world. Intensive use of these devices is commonplace in many industries, including transportation, insurance, manufacturing and publishing.

If these CRT devices are the cause of cataracts (or any other disease), I am sure there would be documentary evidence to that effect and it would have come to light years ago, during CRTs early field history.

Now we are confronted with an isolated situation to which Computer*world* devoted front-page coverage, with the implication every CRT be provided with a label indicating that "Use of This Device May Be Hazardous to Health." In point of fact, the article admitted that a firm link between the cataracts and CRTs has yet to be established.

Consequently, I am sure many of us in the CRT industry are asking what the purpose of the article was other than sensationalism or the fact that CW may have been hard up for front-page news.

Articles of the type in question make Computer*world* look like the *Notionol Enquirer*. What little gained in sensational eye-stopping headlines will be lost along with CW's credibility as a serious industry trade journal.

John T.M. Pryke
Product Marketing Manager
Computek, Inc.
Burlington, Mass.

Where Did Pages 31-36 Go?

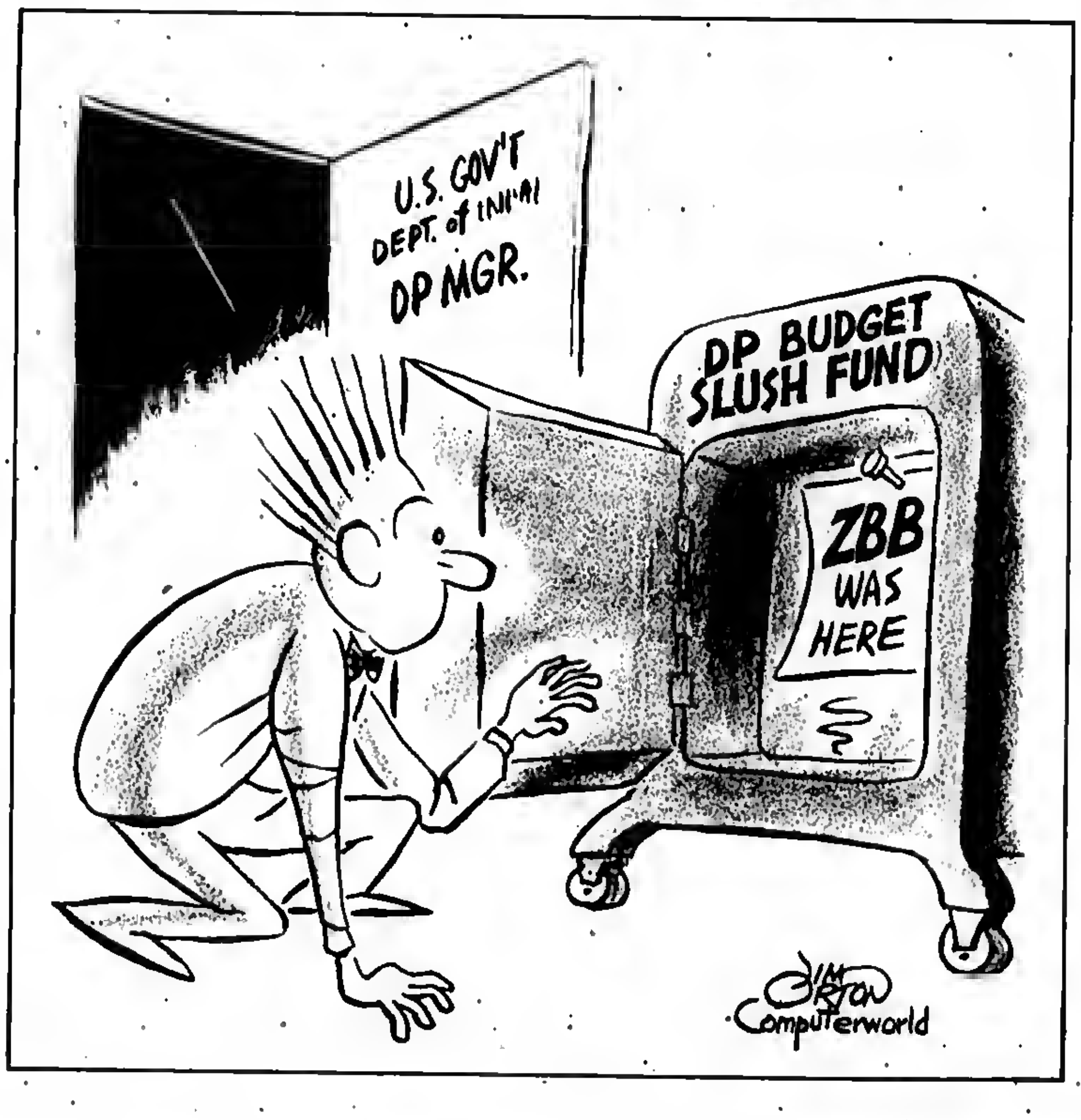
In the mail today, I received the Aug. 1 edition of Computer*world* On Page 1 was an article, bordered in black lines, boasting of the new computerized typesetting used in the issue.

As I was leafing through the paper, I noticed that the page numbers skipped from 30 to 37, at least in my copy. Were the page numbers assigned by computer, or were the pages left out of my copy, or what?

It certainly does not make a good impression for a computer industry newspaper to err like that.

Gary Rubin
Rochester, N.Y.

There was no error. Postal regulations require us to number all "pages." A three-fold advertising insert, printed on all six sides, counted as pages 31-36. Ed.



Data Past

Five Years Ago
Aug. 16, 1972

WHITE PLAINS, N.Y. — IBM 370 users with two or more 3330 disk drive spindles could save up to 73% on monthly rentals of IBM disk controllers with a series of options from IBM. IBM cautioned, however, that the options could result in degraded performance under some circumstances, since a user had first to get one or more Model 3333 units. The 3333s cost $327/mo more than a standard two-spindle 3330.

———

SANTA MONICA, Calif. — Allied Computer Technology, Inc. introduced the Selectoplex Channel, a block multiplexer channel plug-compatible with the IBM 2860 selector channel. The company claimed the device could extend tho life of large IBM 360s by three years.

Eight Years Ago
Aug. 20, 1969

IBM stated basically 'What's yours is ours' in its contract with users for services of systems engineers. The contract stated ". . . [I]t is agreed that no idea, concept, know-how or technique relating to data-processing shall be deemed confidential. To the contrary, IBM shall be free to use and disclose any such information during the course of this agreement and thereafter in any way which it may deem appropriate.

———

EAST NATICK, Mass. — Sylvania Electric Products, Inc. introduced a laser "tape drive" which made permanent recordings on 8mm film. Tho device had a peak packing density of 180,000 bit/in. and a recording rate of up to 21.6 million char./sec.

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Detach here, fold, and place in post-paid envelope attached through binding.

Keeping Up With DP: What's a User to Do?

The Human Connection

By Jack Stone
Special to CW

Juggernaut! The crunching, irresistible onslaught of the mighty forces of new computing technology moves ever onward, trampling over the programming innocents, the systems tyros and the user novitiates.

Yes, I bewail and bemoan, I suffer and sorrow, I ache and agonize. Why? Because I, too, dear reader, have been impacted.

You might well remark, "So what's new? We've all been hit with new announcements."

But I rejoin, "Yes, it's so easy to gloss over new generation announcements within the sanctum sanctorum of the computer center. It's much more difficult to accept a trouncing in the sharp(-shooting) spotlight of the public medium."

Here is my story:

Eons ago, I wrote of my discovery of THE ANSWER to THE MACHINE for programming concepts training [CW, June 6] which, incidentally, I adopted as my family's (nonalphabetic) computer system.

It was (and I write this most remorsefully) the Texas Instruments, Inc. SR-56 Key-Programmable Electronic Slide-Rule Calculator with Algebraic Operating System, for which I shelled out the nontrivial sum of $79.95.

(If the truth be known, I purchased the machine as an item for my business, like any red-blooded American computer services entrepreneur, to obtain the tax write-off and with the intention of renting time on the machine to my kids for 10 cent/hour plus the cost of supplies and a one-time charge for documentation.

(Figuring three hour/day usage by these computer neophytes and a five-day week, I could see my investment returning to me within the year, assuming that during the hilling period my perspicacious offspring would not take a pickax to the chip to see what made it chirp.

("Like father, like son," they say. My offspring came back to me with a counter-proposition. They assembled a horde of their teenage roustabouts and obtained long-term commitments for the purchase of machine time based on volume purchasing.

(And they offered the time at 20 cent/hour list and 15 cent/hour in volume. We were in the process of negotiating a third-party lease when I went off to NCC '77 in mid-June and IT was announced.)

I first learned about IT while waiting for a conference bus in Dallas. I spotted an old friend who works for the CIA and we began chatting about personal computing. I proudly announced my recent acquisition of the "56" and he retorted, "My friend, what are you doing with that old junkpile? Do you also drive an Edsel?

"The '56' is an archaelogical relic to be enshrined in a time capsule, designed to tell folks in future years how it really was in the dawning days of computerism in American society."

I was shattered. My technical obsolescence was showing and I didn't even know it. I struggled valiantly to fight back.

"Hey, man, I just bought it last month. It's the latest and greatest, guaranteed!"

"No, man," he rejoined, "as technical giants go, you are the amazing shrinking man. THE calculator is the new TI Programmable 58, which has the solid-state 'bubble' program library facility."

"Now, wait a moment, here," I responded. "My salesman has been preprogrammed to contact me day or night in the event of a new announcement, and I have heard nothing."

"Of course you wouldn't, since announcement is not scheduled until this morning. You see, we've had 75 of our field agents, 23 of our overseas operatives and 122 clandestines following this technology development very closely. There is just no way we are not going to be number one . . . NUMERO UNO . . . DO YOU HEAR? . . . NUMERO UNO!"

Brrrooother! Was he emotional on the subject of technology supremacy. I covered my embarrassment with a nervous laugh and tried gamesmanship.

"Golly neb, those TIniks are really clever — first the 'chewing gum' magnetic card storage on the SR-52, and now the 'bubble gum' solid-state storage for the '58.'

His face flushed. I thought he was apoplectic. He raged, "No, you idiot! It's a magnetic bubble configuration which — oh, what's the use? You latter-day scientists are all washed up — you'll never catch up."

He fumed as he stepped on the bus. I didn't see him at all during the convention.

I slithered past the TI booth on the exposition floor and deftly placed one copy of the new announcement in my shopping bag. I immediately caught a taxi to my hotel room, locked the door, closed the curtains, turned up the TV volume and plopped into my bed to study the specs.

I almost lost my mind! Solid-state master library of 25 basic programs "free" with the machine, with about 5,000 keystrokes of program information, accessible directly as read-only memory or downloadable into primary memory ... 480 positions of main memory, partitionable by the user into program storage accessible by character and data registers accessible by word ... nine levels of pending calculations in the algebraic hierarchy ... 108 keyboard functions performed by 45 keys ... scientific, engineering and fixed-decimal notation modes ... user-defined labels ... short-form addressing ... insert/delete instructions with automatic resequencing ...six levels of subroutines ...10 control flags ... indirect addressing ...and on and on.

Bought Bundle

I bought a bundle of the '58s" for a class I'm teaching. They're a fabulous help for training in programming concepts, and a great bargain for $119.95 plus tax each, including massive documentation. Unfortunately, they all have to be delivered to my customers.

As for my electronic fossil — the SR-56 — I'll stick with it to protect my investment. I'll just hunker down and tough it out until TI comes out with an alphanumeric capability and a very large wad of bubble (gum?) memory.

I have the stock answer to challenges from my testy colleagues which I have already checked out with my kids when they found out about the "58": "Boys, I have a "56" installed and am currently studying the new announcement before placing a "58" on order."

Readers Eye Criteria in Sale of DP Lists

The Taylor Report

By
Alan
Taylor
CDP

The recent questionnaire in this column requesting comments on the disclosure of Social Security numbers (SSN) when government lists are sold [CW, July 11] produced the clarification for which I was looking.

It is not the SSN issue that worries people.

Nor is it the fact that a person providing his SSN for such purposes as obtaining a driver's license is not told at that time that the number may be used on lists that will be sold.

Instead, readers said they were worried about *how* those lists are used.

And the relationship between the government entity, such as the Massachusetts Registrar of Motor Vehicles, and the person ordered by law to register motor vehicles with him is such that it could be argued that person faces an implied coercion of approval — even when the person does not know what the actual use will be.

The amount of benefit or harm involved is a third key element. It is insufficient to know that some firm paid the Registrar $50,000 for the current year's vehicle registration master file.

It is even less acceptable to know nothing beyond the amount of the sale. The use of the $50,000 also has to be known — and shown pretty specifically — before anyone can give proper permission to retain his name on lists that are sold.

Equally, full information about any possible embarrassment or harm has to be provided, both on an individual and general basis, before any such approval can be provided. It may sound very nice — but if some car salesman is going to use the list to help the other side in a motor vehicle accident case, then self-interest could easily win out over the general good.

Finally, a person who approves the inclusion of his name on lists that are up for sale should be allowed to withdraw his name at any time.

DPers could use these points as guidelines to help management consider whether a particular sale should take place. These could be phrased in questionnaire form, with a space for answering "yes" or "no."

The questions would be:

- Has individual approval been given?
- Before approval was granted, were the uses to which the funds gained from the sale of the list will be put detailed?
- Was any individual or general harm or embarrassment that might occur explained?
- Have the possible future uses of the information been explained?
- Can approval be withdrawn by the individual whose data is involved?

From these simple questions, the person or board approving any such sale could quickly come to a decision. For instance, a charity specializing in skin diseases might well be prepared to "trade" a mailing list with the research department of a drug company wanting to find some rare combinations of circumstances, even though no apparent financial benefit to the charity, or even knowledge of the sale to those on the list, was apparent.

At the same time, the charity could well refuse to sell the list to some museum shops wanting to sell Christmas gifts at a high profit, even though the shops were prepared to pay and the people on the list had given general approval of "uses that benefit."

In short, by describing the situation of the person involved to those making the sale decision, matters will not happen automatically. And that is the most important thing.

Your comments are asked for on this approach — and, perhaps most important, on how it could be introduced into general DP practices.

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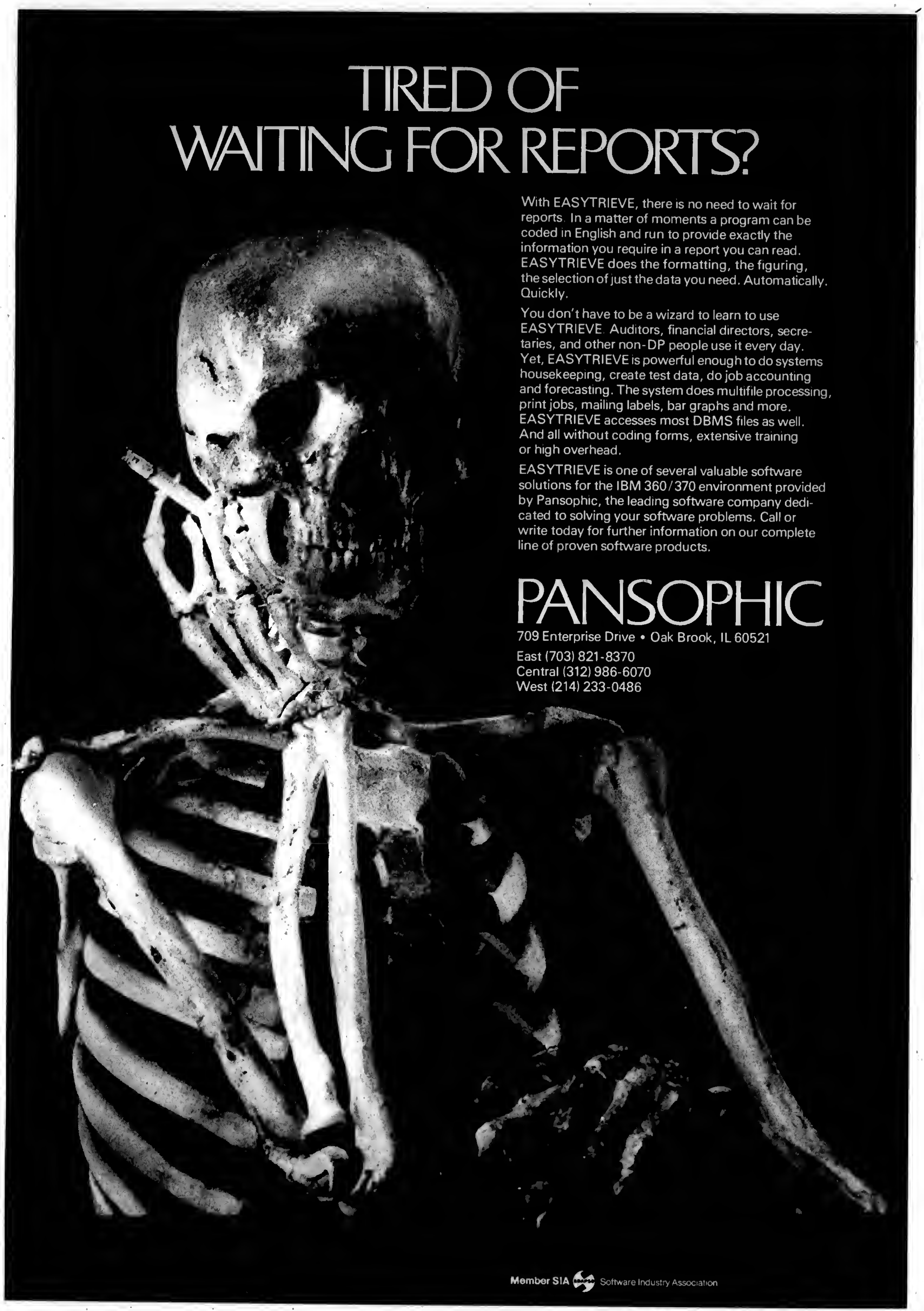
Correction

In the earlier column on sales of mailing lists, it was erroneously reported the Massachusetts Department of Motor Vehicles had offered its master file of drivers licenses for sale. What was offered, and has since been sold, was the department's motor vehicle file.



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Random Notes

'Marketab' Gets Fortran Rewrite

NORWALK, Conn. — Designed to simplify the processing of questionnaire and survey data as well as the tabulation of existing data files, Marketab from Mnemonics, Inc. has been rewritten in Fortran to be compatible with most computers used today, a spokesman said recently.

The system is currently running on a 65K-byte/32K-word Data General Corp. Nova 3/12.

Object code for Marketab is available for $20,000; the Fortran source code costs $22,500. Lease and lease/-purchase plans are also available, the company noted from 280 Connecticut Ave., Norwalk, Conn. 06854.

PCS Enhances Net

VAN NUYS, Calif. — Having installed System 2000 earlier this year [CW, June 27], Proprietary Computer Systems, Inc. (PCS) has now interfaced the data base management system with its own word-processing system on its remote computing network.

The linkage allows users to manipulate large data bases and then produce reports in formats not normally available with conventional DP approaches, a spokesman said from 11125 Saticoy St., Van Nuys, Calif. 91406.

UCC Gets IMSL Library

DALLAS — The 367 Fortran subroutines of the International Mathematical and Statistical Libraries, Inc. (IMSL) library have been added to the facilities available to users of University Computing Co.'s (UCC) remote computing services.

UCC clients will be provided documentation, newsletters and telephone support from IMSL, UCC said from 1930 Hiline Drive, Dallas, Texas 75205.

'To Each His Own'

Etos Creates Virtual PDP-8

HARTFORD, Conn. — Multiple users of a Digital Equipment Corp. PDP-8 can each have a virtual machine with 32K words of memory running under OS/8 or COS-300 with an enhanced version of the Educomp Time-Shared Operating System (Etos) now available from Educomp Corp.

The update provides the small DEC installation with support similar in concept to what is available to IBM 370 shops under the mainframer's Virtual Machine facility; VM/370. Etos supports batch, real-time and time-shared operations running simultaneously, a spokesman noted.

Although any PDP-8 operating system can be used under Etos, Educomp is stressing its support of OS/8 and COS-300 since they are the most widely used systems in the PDP-8 world. With Etos in place, "the myriad of languages available on a PDP-8" can be run concurrently.

Requiring a minimum 24K-word Omnibus PDP-8, the system is said to create a resource-sharing environment with immediate access to card readers, line printers, multiple disk drives, flexible disks, magnetic tapes and terminals "of almost any description."

Virtual disk file storage areas are normally allocated dynamically, but can be preallocated to minimize access time within data files and to ensure space will be available even before a long run is executed, he said.

A single board time-share control module (TSC8-75) is required in addition to the Etos software in order to support the virtual machine environment. TSC8-75 is priced at $2,500 and the Etos software costs an additional $3,450.

Users must have valid licenses with DEC for the user of OS.8 or COS-300 before Educomp will link either of those operating systems to Etos, the spokesman added.

Educomp Corp. is a subsidiary of Quodata Corp., 196 Trumbull St., Hartford, Conn. 06103.

Cobol Changes Eased With 'Chain Charts'

CHERRY HILL, N.J. — The Logic Chain software from Applications Programming Co. (APC) is said to be a maintenance/enhancement system that significantly reduces the time required by a programmer to make changes in existing Cobol programs.

Designed for use in IBM 360/370 or Burroughs B3500/-B6700 environments, the system provides analyses of both instructional flow and data flow within whatever Cobol source program has been input for study, an APC spokesman claimed.

The logic chain chart produced by the system takes the place of the conventional source program Procedure Division and the procedure cross-reference listings during maintenance and updating. This saves "over 70%" of the time presently spent trying to follow instructional flow, the spokesman added.

Although the logic chain chart looks rather like a conventional program flowchart, APC said it is a different and a better document.

The system runs on an IBM DOS-based configuration with 36K bytes available for the program, one disk pack for work files, a card reader and a line printer. IBM OS users require 62K bytes for the program and Burroughs installations should have 36K for a B3500 or 7K words for a B6700.

The package is being distributed on a lease basis for $7,800 the first year, with recurring charges of $900/year, including maintenance. APC is at 498 N. Kings Highway, Cherry Hill, N.J. 08034.

NCR 8200 Gets Precompiler

TULSA, Okla. — Fastbol from Sage Computers, Inc. is an interactive source entry system and precompiler for Cobol programs being developed or modified for the NCR 8200, according to a Sage spokesman.

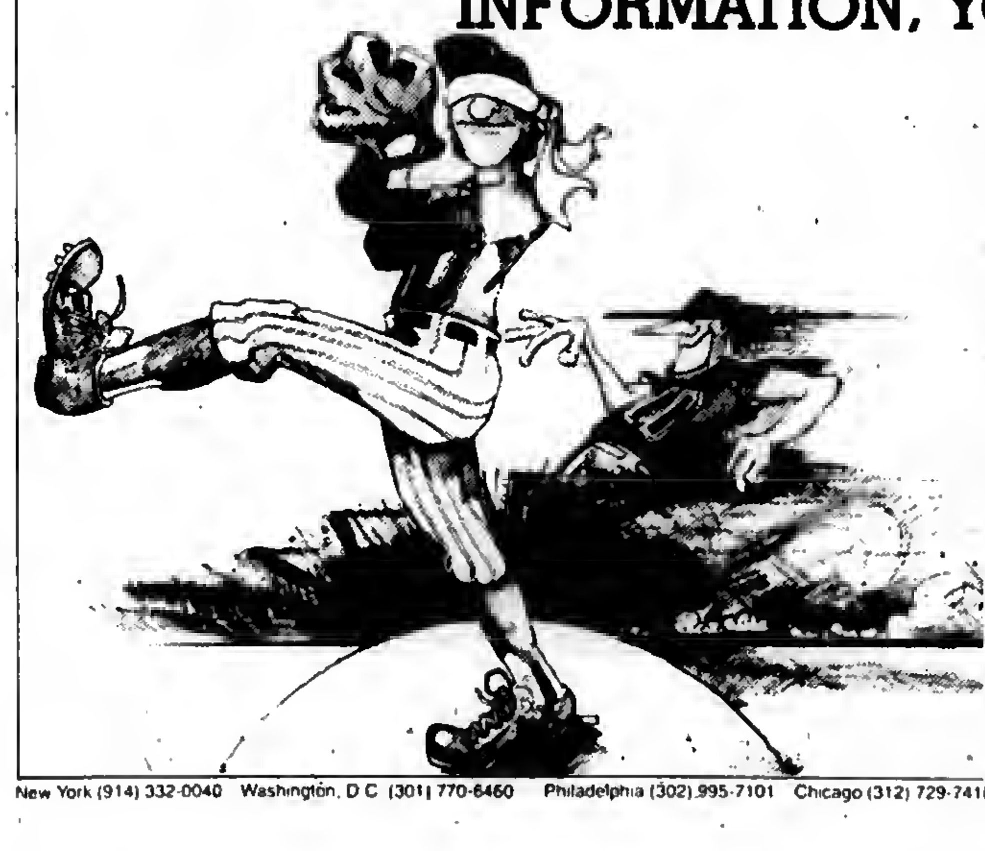
The software supports faster development work, he said, by allowing the use of certain abbreviations in original coding. As with precompilers for larger systems, Fastbol expands this shorthand into standard Cobol reserved words.

Apparently it does not, however, allow the user to define his own abbreviations and expansions.

A tabbing facility that allows the user to move from field to field on an input line is said to be helpful when editing source statements or data entries. An automatic field sequence generator coupled with an ability to change lines at random within a program is "especially useful" when modifying programs.

The package, said to operate in the 8200's user partition with "plenty of space left over," is available under perpetual license — including one year's support — for $450.

Sage is at 2323 S. Sheridan, Tulsa, Okla. 74129.



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Picking a Winner — Part 2

'Politics' Must Play Part in DBMS Selection

By Robert B. Chamberlain
Special to CW

The points touched on in 'Technicians Alone Should Not Select DBMS" [CW, Aug. 8] carry with them the implications of "politics" — and the people who discerned that fact are the ones who have a chance at implementing a corporate data base.

"Politics" in this context is not a dirty word; a political problem can only be met with a political solution.

In fact, the politics involved in a successful data base management system (DBMS) selection is likely to differ only in style from that which occurs in a "technician-only" setting. That difference may be seen as the politics of force of personality instead of the politics of organizational clout.

In the technical area, the dispassionate approach known as the "Delphi procedure" seldom seems to win out. A methodical if rather tedious and somewhat redundant means of DBMS selection involving matrices, installation-dependent weightings, etc., the Delphi procedure is a useful tool, but it has two drawbacks in a technical team environment:

- Weightings are meaningless if they refer to the current or converted applications environment instead of the projected data base environment, a likely occurrence in a heavily technical selection orientation.
- The rigorous methodology is likely to be scrapped when a team consists, as it just about always does, of three or four close associates or the same number of strong egos.

The real resolution of the selection, then, is by force of personality, generally reflective of status within the organization. Sometimes, however, sheer strength wins.

This occurs when only one individual survives a marathon meeting called to "choose the damn thing and get on the road." He will stumble out with his face covered with stubble, mumble the lucky vendor's acronym and then, since most of the organization was not aware of the momentous nature of the meeting, fade into obscurity, along with the technical groups' choice.

An obscurity which, it can be observed, was predictable by the very nature of the team's composition. As to what that composition should be, let's look first at who the team's leader or chairman should be. The prime rule is, if the chief executive officer doesn't know the name of the selection team chairman, he'll never know the results of the team's effort.

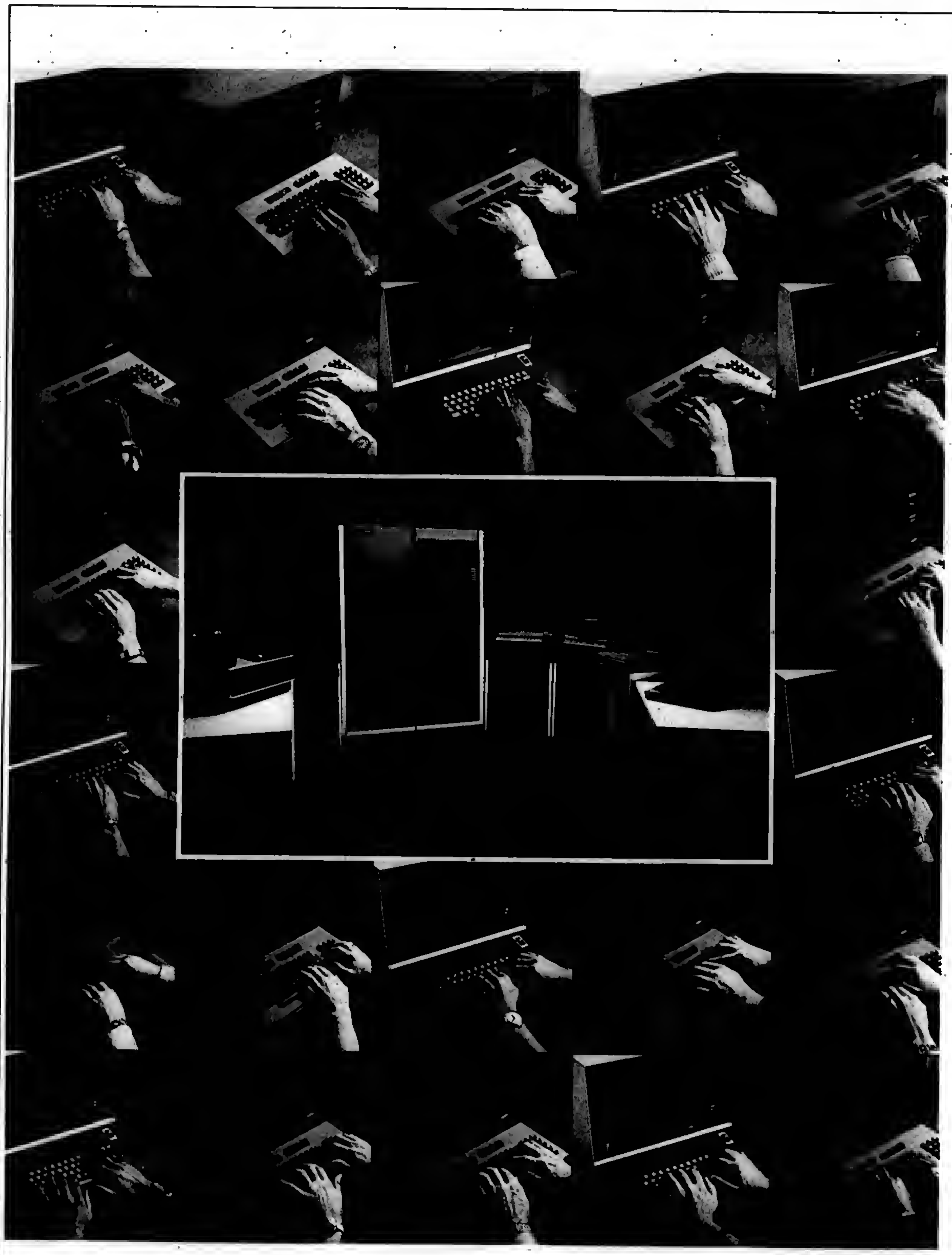
Data Basics

In other words, the team must be associated with an individual who is strong enough to command attention in the firm and whose leadership indicates that corporate commitment to DBMS is firm.

Other team members would include a chief analyst (preferably one with both a sturdy disregard for the status quo and the ability to quantify new requirements), a chief technician; a user representative appointed by the chairman; and a person from the operations section who can provide direction on such useful ordinary subjects as forms usage, current report distribution, etc.

All team members should be senior enough to call on personnel within their own areas as various aspects of the prep-

(Continued on Page 21)



NOTICE OF REQUEST FOR PRICE

The State of Indiana, Department of Administration, Data Processing Division, is accepting sealed proposals on a financial-leasing agreement on an IBM 370/168-M33 Computer System, part of which is currently installed and the rest on order from IBM due for installation in August, 1977.

The proposal includes purchase from the State of an installed IBM 3165-II Model K Computer System.

Proposals must be received in room 507 at the State Office Building Indianapolis, Indiana, by 10:00 A.M., Legal Time, August 18, 1977.

For additional information contact Charles E. Woodard (317) 633-4690.

Module of Month Plan Has Language Option

SADDLE BROOK, N.J. — Users in a range of environments may find low-cost solutions to a variety of DP problems through the Module of the Month (M/M) Division of National Data Systems, Inc.

Under the M/M plan, modules are available in a choice of ANS Cobol, RPG-II or IBM Assembly language for as little as $14.95 for a source listing or $19.95 for a listing and a machine-readable card deck, according to a spokeswoman.

The highest priced module now is $24.95 or $34.95, she noted. All orders must be prepaid to allow the division to continue these prices, she emphasized.

The division publishes a newsletter describing its software. Despite that and its "clubby" sounding name, however, the plan does not involve memberships, minimum purchases per year or automatic mailings unless the user notifies the division otherwise, she added.

The most recent routine available through M/M is Csort, which manages in-memory sorts with "any combination" of ascending or descending keys. Based on a bubble-sort algorithm, it is said to require much less memory than the internal sort that invokes "the usual sort utility."

For a limited time, Csort is available under M/M's $14.95/$19.95 pricing, the spokeswoman said.

Other modules include a Julian/Gregorian date conversion and perpetual calendar subroutine; a Modulus-10 check digit subroutine; and Tallyall, a utility for column-by-column analysis of data.

The data conversion routine works "in either direction" and includes a determination — and printing — of the day of the week of the date, if desired.

Tallyall is the most substantial of the routines now available and it carries the $24.95/-$35.95 price. In all cases, the card decks can be furnished in either 80- or 96- column format.

Requests for the M/M newsletter and orders for the modules should be addressed to Module of the Month, National Data Systems, Inc., 299 Market St., Saddle Brook, N.J. 07662.

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'Politics' Part Of DBMS

(Continued from Page 20)

aration for the actual selection take place. No weighting of each team member's influence should be construed; each plays his own role in the process.

The chairman, in concert with the others, makes the final decisions and they become corporate decisions.

A team of this type has a much greater likelihood of effecting a successful transition to data base because it contains the key ingredients of organizational support and careful planning. It should be incumbent upon all would-be data base shops to carefully consider the options discussed and learn how they can affect successful implementation.

Chamberlain is senior consultant, information systems, with CACI, Inc. — Commercial in New York. He is now on temporary assignment in Europe.

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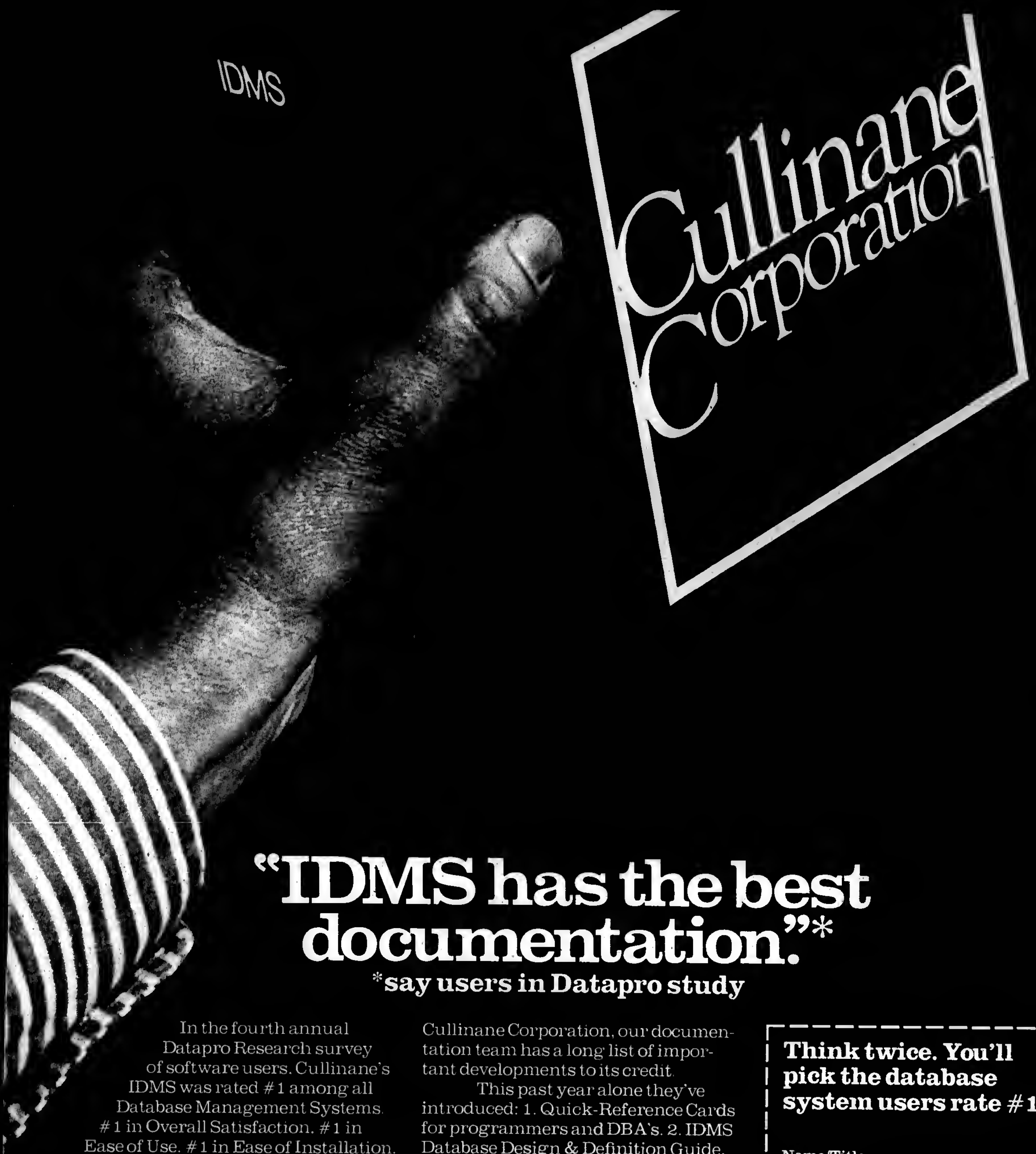

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Cites Limitations

SNA Survival Short, Expert Predicts

By Ronald A. Frank
CW Staff

DALLAS — IBM's Systems Network Architecture (SNA) cannot survive as a viable architecture beyond the next few years, according to Howard Frank, president of Network Analysis Corp.

Speaking at a recent meeting of the Computer & Communications Industry Association here, Frank described to industry executives the limitations that exist in the structure of SNA.

Even though IBM touts SNA as the architecture of the 1980s, this is "virtually impossible" because of its current inflexibility, Frank said. Unless SNA capabilities are upgraded, SNA will be "the most archaic architecture around" when users want to be able to freely attach minicomputers, maxicomputers and terminals to their networks.

One of SNA's biggest limitations is that arbitrary point-to-point communications within a network cannot be accomplished easily, Frank said. He attributed this to the primary/secondary status required for stations in an SNA configuration.

"Stations must have either primary or secondary status. These stations are usually not software-programmable, but are preprogrammed at the time the network is put in place," he noted.

This means the user often cannot go from point A to point B because point A may not be in the hierarchy chain, he explained.

SNA configurations generally require a terminal to communicate with its own host CPU before a line can be established to a terminal attached to another host. The capability that permits a terminal to go directly from its own domain to a second domain has been described in IBM's Advanced Communications Function (ACF), but it is believed the company has not yet demonstrated this is a network, Frank said.

According to Frank, other limitations existing in SNA are:

- The host software gets more complex as the network gets larger.
- The local loop required for certain SNA terminals is cumbersome became if a single terminal goes down the entire loop goes out unless the user builds in alternate paths.
- Timing issues in the SNA loop requiring everything to be "sensitively tuned."
- The loop configuration has throughput problems because its capacity is much higher than if the net were constructed with a "tree-type concept."

(Continued on Page 25)

User Optimizes Phone Network With Computerized Switching

DALLAS — Southland Corp. is beginning to solve many of its telecommunications problems with the help of a computer-based switching system for managing long-distance telephone communications.

The Datapoint Corp. Infoswitch system installed last March already has presented Southland with a $20,000/mo reduction in long-distance telephone costs, reduced waiting times for outgoing calls and helped cut the average call length, according to Jerry Edwards, Southland's manager of communications.

The system also is providing the company with the kind of detailed traffic information it needs to improve its expanding communications network, Edwards said.

In addition to being a large operator and franchiser of self-service convenience stores in this and three other countries, Southland owns and operates a chain of specialty food shops, three food-processing centers, 12 regional dairies and a truck leasing firm.

Until a few years ago, the conventional telecommunications facilities employed at Southland were adequate. However, an expanding volume of traffice between the company's divisional and regional offices and its corporate headquarters here, combined with higher line tariffs and steadily increasing long-distance costs, soon outmoded those facilities.

When Edwards joined Southland a little over a year ago, he was faced with a challenging situation. "The telecommunications program at Southland was not very well defined and we were without the kinds of communications information it would take to design and implement an effective corporate program," Edwards recalled.

"Our only telephone facility, a 701 Centrex, provided us with nothing in the way of accumulated line-usage statistics or comprehensive traffic analyses. Since the configuration of our previous switchboard facilities would not allow us to process and route incoming calls, approximately $35,000 a month was spent on operator-assisted calls coming into the Dallas area," he continued.

"Also, a traffic study conducted by the telephone company shortly after I came to Southland indicated utilization of the company's seven national outbound Wats lines was only about 60%, with queuing times ranging anywhere from one and a half to two hours," he said.

"Obviously, we had to find a way to reduce the cost and maximize the effectiveness of our long-distance telephone facilities. But we were also looking for a call management system that would provide us with line-usage data and call detail with which we could design a more effective nationwide communications network," he said.

After an extensive study of Infoswitch and two other telecommunications management systems, Southland decided the Datapoint system could best meet its long-distance telephone switching and management needs,

(Continued on Page 24)

Source Book Covers IBM

CULVER CITY, Calif. — Users who need to keep track of IBM communications hardware, software, protocols and other teleprocessing topics can get help from a handbook published by Contemporary Communications, Inc.

Called *The IBM Teleprocessing Source Book*, the 144-page publication includes references to IBM technical manuals, trade journal articles and other references related to IBM communications products.

The publication covers operating systems and access methods and lists IBM terminal systems as well as other equipment. It costs $45 from Contemporary Communicatons, Box 3075, Culver City, Calif. 90230.

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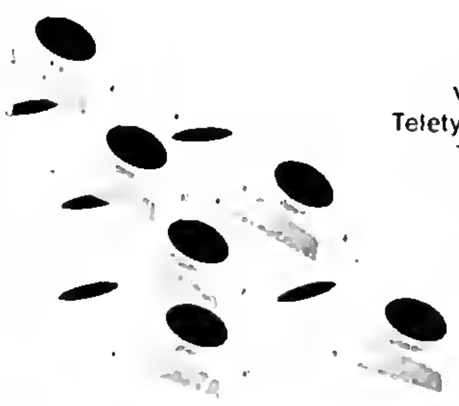

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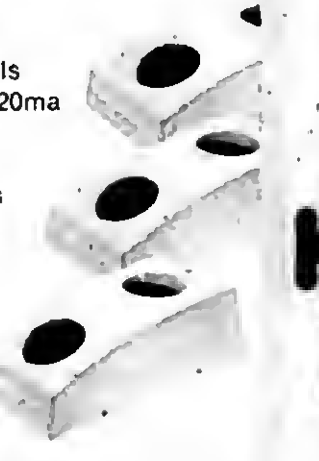

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Switch Helps User Reduce Telephone Costs

(Continued from Page 23)

Edwards said.

The Infoswitch system installed at headquarters includes a Datapoint CPU (which Datapoint won't identify) with 48K user memory, a 5M-byte disk for program and accounting data storage and an 80 char./sec Datapoint Freedom printer for permanent copy report generation.

It also has an intelligent real-time controller that manages all the details of call placement and a reed relay matrix for telephone line switching and all other necessary line interfaces.

The main processor console is equipped with a typewritter-style keyboard plus an 11-key numeric pad, five control keys and a 960-character CRT display.

"The system installation was extremely smooth. The equipment was installed on Friday, tested over the weekend and in full operation by Monday morning," Edwards said.

"In the beginning we were bothered by a few minor problems — static electricity problems and telephone company interfaces that needed adjusting — but these were pinpointed and corrected almost immediately by Datapoint's customer service personnel," he recalled.

The elimination of unauthorized calls, increased availability of outgoing long-distance lines, effective routing of calls over least cost facilities, a reduction in the number of switchboard attendants and more detailed call-accounting information have added up to substantial savings, according to Edwards.

"Before we acquired the Infoswitch, nearly 29,000 outgoing long-distance calls — which equaled about 130,000 minutes of calling time — were being processed a month. Each of these individual calls lasted about 6.9 minutes and the average queuing time for a call was about an hour and a half," he said.

"A great deal of money was wasted on Wats lines that were either inaccessible or only partially utilized. Now that Infoswitch has provided us with an extended and flexible route selection of economical line facilities, we have cut our costs by more than half," he claimed.

"With this kind of savings in time and money, we have been able to eliminate two outgoing national Wats lines and four intrastate Wats lines and reduce our switchboard operating staff from three to one."

Because the management system maintains a detailed accounting record of each outbound long-distance call — including the date, time of day, caller identity code, destination telephone number and call duration — unauthorized calls have been discouraged or eliminated.

Infoswitch also has reduced the queuing time for a call to under 30 seconds; maintained a constant flow of traffic over all outbound Wats lines, and helped reduce average call length from 6.9 minutes to 4.1 minutes, according to Edwards.

Call Control Routing

Southland is also using the system to control and route Wats line calls coming into the Dallas area from locations throughout the rest of the country.

In Southland's system configuration, all 10 of its national inbound Wats lines terminate on the input side of the Infoswitch. To prevent call blockage or excessive queuing times, these Wats lines are matched with 10 tie lines running from the management system to the Centrex facility.

"Previously," Edwards noted, "all inbound long-distance calls were operator-assisted (third-party billing, credit card and collect calls) and the cost was approximately $35,000 a month. Now, with the use of the Infoswitch, we are processing the same number of calls and perhaps more for about $15,000 a month."

The system is also equipped with a set of maintenance diagnostics in microprogrammed memory. If any component fails a diagnostic test, the exact position of the failing board is indicated on the control panel for immediate location and replacement by the communications manager or service technician.

"When it came to choosing the Infoswitch system, the maintenance factor was a big plus, Edwards noted.

"The system virtually does all the maintenance for me. Not only that, I can replace a failing circuit interface board without shutting the system down.

"The system requires only one type of circuit interface board, whereas the other systems required a different type board for each type of line facility utilized."

The Infoswitch system has profited Southland in a number of ways, Edwards concluded. "The detailed accounting and line-usage data provided by the system has enabled us to accurately assess existing and future communication requirements. Most important of all, the ability to communicate quickly and efficiently is enabling Southland to maintain an aggressive posture in an extremely competitive business world," he said.

Azurdata Adds Service Plan

RICHLAND, Wash. — Users of portable order entry terminals from Azurdata, Inc. can now select a Full-Service Program that ensures timely maintenance and provides management reports to monitor both terminal performance and service costs, the company said.

Azurdata is located at 1100 Jadwin Ave., Richland, Wash., 99352.

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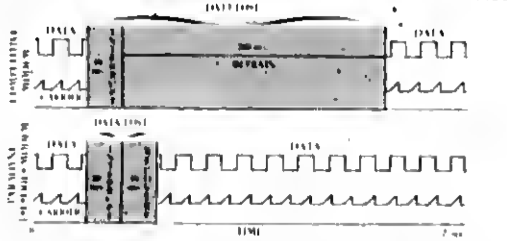

The "bridging" effect of the Paradyne modem reduces retrain time by approximately 80% when a line interrupt occurs. LSI Series modems "bridge" an initial train for up to two seconds after interrupt, so data keeps transmitting rather than being lost while the modem retrains.

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Multiterminal Packet Net Being Built in Netherlands

LRIJSWIJK, The Netherlands — A minicomputer-based packet-switching network is being built for the Rijkswaterstaat (water control department) of the Dutch Ministry of Transport and Public Works.

Called the Communications Network (CNET), the system is described as the first packet-switching network in Holland. In mid-1978, it will service existing local and remote terminals, of several differing types, by allowing them to communicate with Rijkswaterstaat's central computers located here.

In 1979-80, CNET will provide communications between several Dutch ministries' networks of the Dutch Postal Telephone and Telegraph Authority. This will enable sharing of the existing large computer facilities.

At that time, CNET will act as the primary data transport for a number of monitoring and control projects currently being planned or in development on a national scale. These include projects to collect and process data on river water quality and flow rates and to measure the characteristics of Dutch coastal waters, according to a project consultant.

A major advantage of CNET is that it will take care of all necessary communication protocol conversions.

The network design will be based on the principles adopted in the switching nodes of the European Informatics Network (EIN). EIN is an international packet-switching network designed and implemented in 1974-75.

New concepts will be incorporated in CNET, including the use of the CCITT recommended X.25 protocol incorporating a virtual call service.

CNET hardware includes a Univac 1100/40 and two Philips P1400 mainframes. Minicomputers will be Digital Equipment Corp. PDP-11/34s with 48K words of core memory and communications interfaces.

Of the five PDP-11/34s, three will function as host interface processors for the mainframes while the remaining two will operate as switching nodes for terminals in the network and will connect to two of the three host interface processors.

Connection between the minicomputers will be over 4,800 bit/sec lines with the majority of terminals operating on private lines.

SNA Limitations Cited by Expert

(Continued from Page 23)

The SNA structure sets up "enormous complexity in the host," Frank said, referring to the fact that teleprocessing software modules are shared between the CPU and the 370X front end. The number of software modules of the Vtam access method that reside at either processor depends on the specific network configuration, he said.

There is no one that understands the cost/performance trade-offs of an SNA net and "no one really understands the economics involved," he said.

Frank also outlined the dependence of a 370X on a specific mainframe and said this is a liability when the CPU is not operating. Other networks such as the Arpa net have shown that it is possible to build front ends that can operate with multiple CPUs, he noted.

"I don't know of very many people that have SNA working," he said. "I've been told there are 85 SNA installations, but these are all in the development stage rather than in the operational stage."

IBM reportedly has tried to overcome the terminal -host dependence by allowing an operator to establish an alternate path to a second CPU. But this is not a viable solution for unattended sites or networks with hundreds of terminals, Frank said.

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Data Entry Conference Set for October

NEW YORK — The First Annual International Data Entry and Distributed Data Enry Conference will be held Oct. 17-19 at the Waldorf Astoria here. The conference will be sponsored jointly by the American Management Associations (AMA) and the Data Entry Management Association (Dema).

The AMA/Dema conference will concentrate on the human side of data entry and distributed data entry, according to a spokesman. There will be seminars conducted by authorities with the latest information in the field; panel discussions to present different viewpoints about common problems; and workshops to enable conference members to exchange ideas and experience, he said.

Some of the topics scheduled for the three days include "Motivation and Communications," "Data Capture," "Performance Measurement and Quality Assurance," "Implementing a Data Conversion" and "Managing and Controlling a Distributed Data Entry Environment."

Dema members attending the conference will have an opportunity to participate in that organization's first annual business meeting, the spokesman noted.

Additional information and registration details can be obtained from Marilyn Bodek at Dema, 16E Weavers Hill, Greenwich, Conn. 06830.

Clean Design Ends 'Powerful' Problems

By Warren Lewis
Special to CW

There are a great many DP professionals around who know about the requirements for clean, stable power in a computer room.

There are also a lot of electrical contractors and consultants around who are very good at designing electrical power structures for buildings and industrial plants.

Unfortunately, the electrical people and the DP people do not communicate well when it comes to designing the power structure of a computer facility.

I have spent many years with the facilities planning staffs of several major computer manufacturers, and I can attest to the fact that, more often than not, the power structure of the computer room is inadequate as originally designed. The result of this poor design is that the computer starts having intermittent problems — often referred to as "mysterious computer failures."

Typical failures occur when the computer mysteriously halts, the computer goes to wrong addresses, garbage comes out of the computer and when programs will run some days and not others. When the installation problems are more serious, safety can be involved or rotating equipment such as disk drives can be damaged.

IBM states in one of its customer engineering manuals that about 40% of the input power receptacles in customer locations are initially phased improperly. This can cause equipment damage — or such fun things as disk drives rotating backward.

Sometimes a problem as basic as inadequate power occurs. At other times, the environmental controls interact with the computer controls. At times like this, it is not unlikely for the computer to do something funny every time the air conditioner cycles.

Most electrical contractors will tie the computer room into the standard building wiring. This almost assures the power into the computer room will not be clean.

The problem is usually caused by multiple tie-ins to the building ground structure. Transients on the normal building wiring are sure to get to the computer. Most electrical designers have a gross misunderstanding of what a computer grounding structure should look like.

Normal grounding structures are designed for electrical safety and cost. This usually

(Continued on Page 29)

CMC Changes Leasing Policy

LOS ANGELES — A number of pricing policy changes in the lease structure of its Keyprocessing systems has been reported by the CMC Division of Pertec Computer Corp.

For CMC 3, 5 and 6 Keyprocessing system customers who execute or extend a lease to a term of 24 months or longer, CMC is offering software features for multiple formats, reformatting, tape entry and data validation at no charge, according to a spokesman.

For its CMC 7, 9, 12 and 36 customers, CMC is offering lease rate discounts of 5%, 10% and 15% in lease renewals for an additional one, two and three years respectively.

An overall 2% increase in Keyprocessing lease rates on new leases, renewals and extensions became effective July 1, the spokesman added.

CMC is located at 12910 Culver Blvd., Los Angeles, Calif. 90066.

Art Depicting Early DP Offered

SANTA ANA, Calif. — People in DP centers who are tired of seeing swirls and sworls from plotters and graphic output from printers adorning the walls as "decor art" may be interested in an offering from the *Data Entry Digest.*.

Ronald G. Henderson, editor of the publication, has a limited original collection of drawings that depict turn-of-the-century DP activities. The drawings were made from original photographs and publications found in archives in different parts of the country, he said.

The five drawings in the set depict the use of the original keypunch and card sorter, as well as persons using early telephones and dictating machines. The series includes a sketch of the "boss" sitting behind his rolltop disk, Henderson said.

The drawings will be furnished in two sizes, one poster size and one framing size. Each set will be numbered and signed by the artist.

A set of both size drawings costs $39 from the *Digest* at 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

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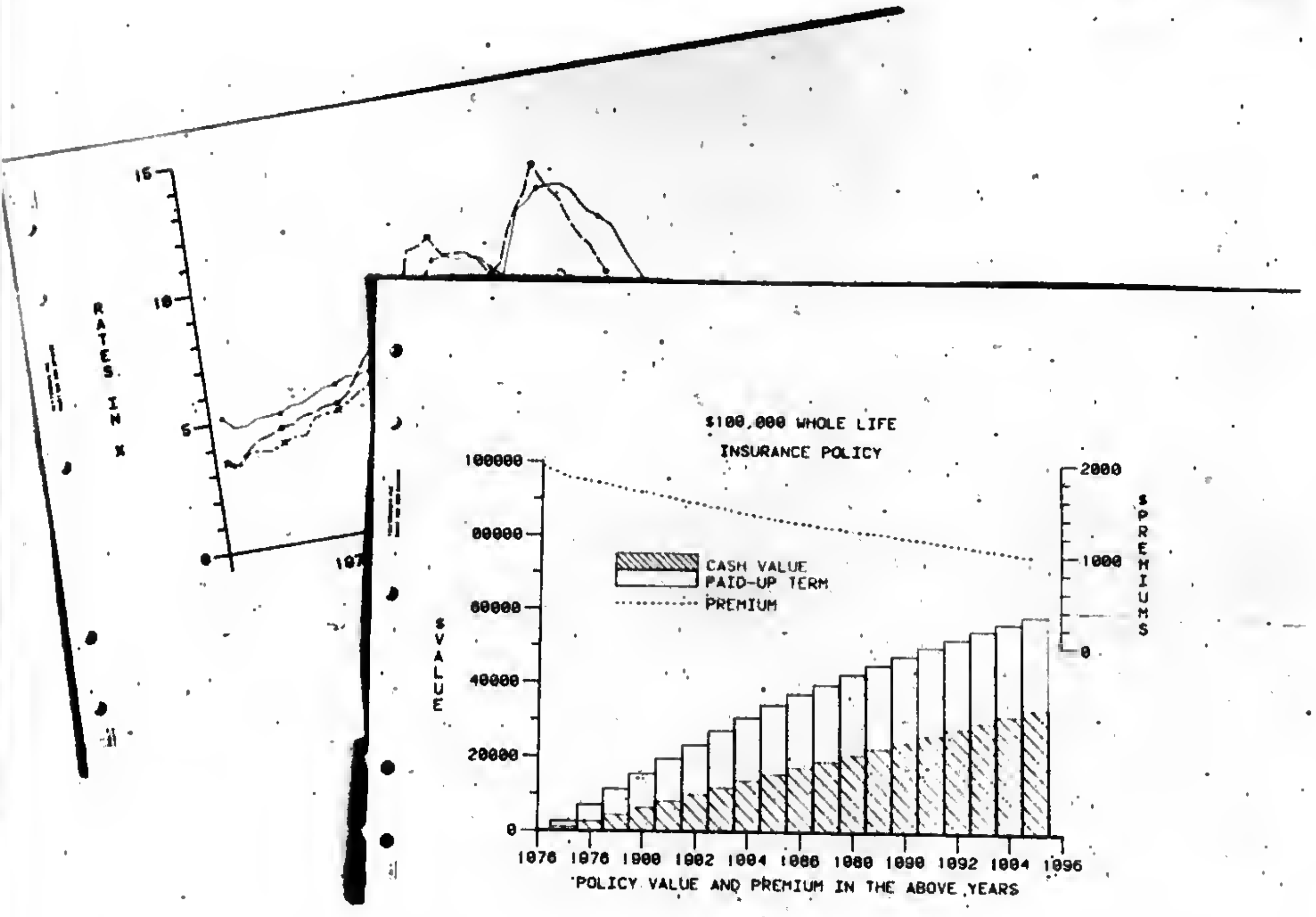

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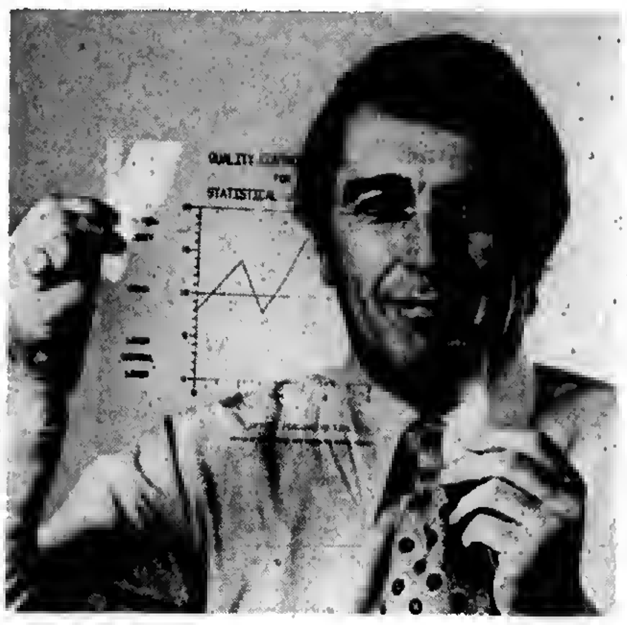

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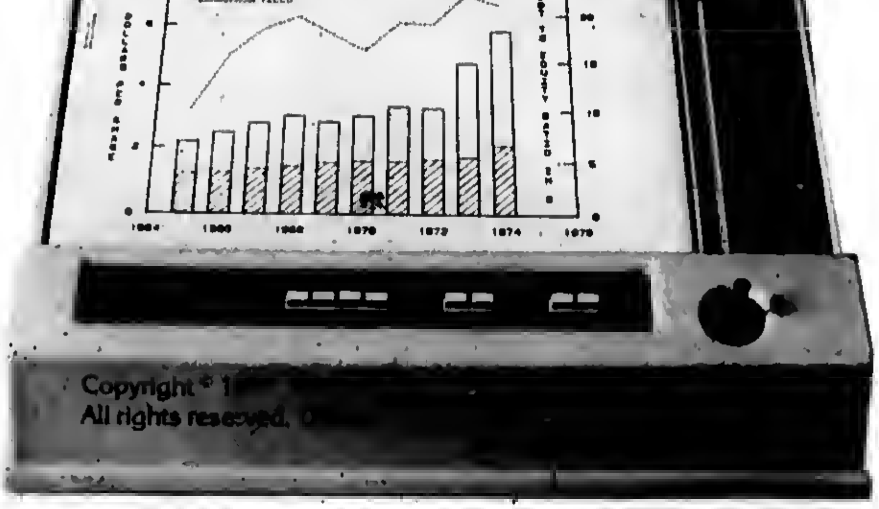

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Bad Power Design Causes CPU Problems

(Continued from Page 27)

results in a minimum-code design.

This minimum-code structure is often subject to ground loops and other horrors faced every day by computer service people. What is needed is a single-point ground structure that not only meets the safety codes, but also the performance requirements of each computer manufacturer.

The Security Factor

Elaborate precautions are usually taken to protect the integrity of computer facilities. Unfortunately, the power to the facility is generally left out in the open, where anyone can get at it.

It is not surprising to find an isolation transformer in the janitor's closet or even out in the parking lot. If the transformer is tampered with, the whole computer facility goes out.

Why is this security gap allowed? Simply because very few even know that the gap exists.

Another farce is often documentation. After the power structure is installed and the electricians leave, there is rarely anyone who can trace problems in the wiring. If any documentation is provided, it is generally inadequate.

In addition, the wiring is often poorly labeled and difficult to trace. It can — literally — leave the DP manager in the dark.

This is poor human engineering. Even the electrician who originally installed the room usually can't come back six months later. and easily trace a problem.

Build and Hope

The best an electrical contractor can do is design an electrical structure for a computer room, build it to code and hope it works.

But there is a better way. The alternative is to gather all of the electrical power apparatus in one place inside the computer room, put it in a cabinet and lock it up tight. The computer room people then have total control over the power structure. Nobody else can get to it, modify it to defeat its purpose or damage it.

The answer, than is to put the computer power in the hands of the computer professionals. Nobody else is sensitive to the unique problems that exist in a computer room. An electrical person will argue that the computer is "just another load" on the electrical system. It's not; it's much more critical.

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Lewis is vice-president of engineering with Computer Power Systems Corp. of Long Beach, Calif.

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Printer Configures System To Produce Complete Pages

By Frank Vaughan

CW Staff

DALLAS — A yearbook publisher here is using a medium-scale mainframe as the heart of a multivendor system that creates page positives complete with text, photo areas and art rules.

Taylor Publishing Co. officials refer to the system as "Pagination" because it sets and positions type, blocks out space for pictures and numbers each page. There's no need for the traditional cutting, pasting or positioning by hand, a spokesman noted.

Taylor has used the system since 1972 to turn out full pages of type and picture layouts for 1.2 million original pages each year.

"This system has given us a tremendous edge over our competition," according to Randolph B. Marston, Taylor's president.

Marston estimated the Pagination system contains about $5 million worth of hardware and software.

"We found there wasn't a system on the market that could do everything we wanted in copy preparation and typesetting. We had to create it ourselves," Marston recalled.

"We put our ingenuity to work and purchased the most advanced equipment available at the time, then we designed the software and hardware to utilize it to the fullest advantage," he said.

The system is built around an IBM 370/145 configured with 256K bytes of IBM memory and 256K bytes of add-on memory from Cambridge Memories, Inc. The CPU processes text and page layout data, performs hyphenation and justification and computes the proper location of all elements on a page, the spokesman said.

The mainframe is equipped with seven Telex Corp. 6316 disk drives, four California Computer Products, Inc. Model 235-11 double-density disk drives, five Telex 6420 Model 7 tape drives, two Telex 5403 printers and two IBM 2540 card readers.

Tape generated by the 370/145 is used to drive a Harris Corp. Fototronic CRT typesetter that turns out pages ready for film stripping and plate making.

Digitizing, which is common in engineering and scientific applications but is unheard of in publishing circles, is part of the pagination process, according to the spokesman.

Taylor's digitizing system is based on a Texas Instruments, Inc. 980B minicomputer configured with 65K bytes of memory. Complementing the mini are 12 Summagraphics Corp. digitizing boards, 12 Tektronix, Inc. 613-1 graphics display terminals, one DS-330 disk drive from TI and a Printronix, Inc. line printer.

The system enables an operator to copy the layout of a yearbook page and transfer it to permanent disk storage in about 45 seconds. A layout is made when the text in put in place, pictures are scaled for size and positioned and horizontal and vertical rule markings are inserted.

Each operator is able to check the accuracy of the layout on a display terminal, the spokesman noted.

While the layouts are being prepared by the digitizer, text input is accomplished through a Recognition Equipment, Inc. Input-80 optical character reader. Copy prepared on an IBM Selectric typewriter is read by the scanner at a rate of 12 page/min. and transferred to magnetic tape. The type size and style is specified at the same time.

The tapes from the digitizing system and the optical character recognition operation are eventually processed by the 370/145 and the information is merged on a single tape for use on the Fototronic typesetter.

In 10 seconds, the spokesman said, the Harris device produces a full page positive containing the text, picture areas and art rules.

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Believer in Multiple CPUs Says

Two Minis 'Express' Data to Truckers

By Esther Surden
CW Staff

CARLISLE, Pa. — "I believe in multiple small systems because when the big one's down, everything is down," Dick Guyton, DP manager for Daily Express, Inc. said in explaining how his firm has evolved into a user of two on-line minicomputers and one batch-oriented small business system.

The company is a specialized truck carrier that hauls truckloads of farm gear, heavy machinery and construction equipment.

The batch system, an NCR 101, is used to perform accounts receivable and payable, contractor settlements to pay contractors who deliver the loads, a self-insurance program and fuel tax reporting as well as to keep track of any areas with which regulated companies have to comply.

The two on-line Microdata Corp. Reality systems perform a motor truck dispatch application and also do the billing, accounts receivable and payable and check-clearing activities for two other divisions of the company.

Daily Express had been computerized with the NCR equipment since 1970, but decided it needed to go on-line to keep track of its motor dispatch application, Guyton said. Prior to the installation of the systems, dispatching had been done manually.

"We were handling the application with little pieces of paper stuck in slots in the wall," he recalled. "We had a plastic card that represented a trailor, and we had a 4 by 6 card that represented a power unit. Then, when we wrote up the work order, we would match the appropriate tractor with the appropriate trailer and put the load card with it.

"Then when you made an entry on the loadcard, you had to look for it, write the entry on it and then pass it over to the entry department. So a lot of time was spent searching" for the card, he said.

On-Line Dispatching

Because communications costs were rising when it couldn't find the information needed to respond to phone calls and because it was having difficulty keeping track of its equipment, Daily Express turned to an on-line dispatch system.

An extensive search that took about two and a half years narrowed the field of available systems down to the Microdata Reality, Hewlett-Packard 2000, Interdata 8/32 and the Digital Equipment Corp. PDP-11. The Reality was chosen because of its operating system, Guyton said.

The first system was purchased from Keystone Data Systems, Inc., the Philadelphia-area Microdata dealer. A second system was bought later.

One of the on-line systems has 64K of memory and includes 25M bytes of disk storage, a magnetic tape system and 24 communications ports. The other, also a 64K system, has only 20M bytes of disk, tape, 18 communications ports and a printer.

The firm has about 28 CRTs in-house. Outlying sites communicate with the system via 13 Decwriter teleprinters, several Teletype machines and CRTs.

Programs Written In-House

Programs were all written in-house in Basic, Guyton noted, because there were no packages available for "what we wanted to do." The Microdata English language is used for ad hoc report generation, he added.

Users of the dispatch application access an integrated data base which includes a load file, tractor file and trailer file. When the sales department receives an order, it keys the information into the system through its CRTs.

The data entered includes load information and a complete description of the job. "We don't have a hard-copy load card, in effect," Guyton pointed out.

The information is then made available to the dispatchers. Scanning CRTs at their locations, they determine what resources are available, what loads they have to move and when they have to move them and then assign equipment.

The act of assigning equipment simultaneously updates the tractor file, trailer file and load file, Guyton said.

When a trucker calls in after the truck has been loaded, the dispatchers input the actual weight and delivery date as well as any other information he might need to complete the delivery or the firm might need to produce a bill.

When the trucker empties the load, he calls a dispatcher, probably located in a remote location. The dispatcher keys in the driver's unit number and enters any final billing information needed.

The system also produces management re-

(Continued on Page 33)

Mini Bits

Iota Has Alarm Feature To Alert System 32 Users

PROVO, Utah — Iota Computer Services, Inc. has a device that reportedly alerts IBM System 32 operators when the system needs human attention.

Called the Hawkeye Sentry, the device is said to notify an operator when a system detected blinking error occurs or when the operator is in an interactive data entry mode and hasn't entered data for a significant amount of time.

The audible notification is repeated every 15 seconds until it is acknowledged by the operator.

The alarm can be disabled by pressing a stop button on the system control panel if the system is validly idle.

The Hawkeye Sentry is user-installable and costs $285. It will be available in the fourth quarter from Iota, which can be reached at P.O. Box 1321, Provo, Utah, 84691.

Seminar Set on Warehousing

CHESTNUT HILL, Mass. — A seminar on minicomputer systems for warehousing/distribution operations will be given Sept. 14-16 at the Management Institute of Boston College's School of Management here.

The seminar will attempt to tell managers "how real-time interactive information can be used to improve productivity in receiving, distribution, back-order handling, inventory control, stock order locater systems and scheduling, among other applications," a spokesman said.

Leading the seminar will be Stephen A. Levine, president of The EDP Corp.

The sessions cost $425. Additional information is available from the Seminar Administrator, Management Institute, Boston College, Chestnut Hill, Mass. 02167.

Lockheed Systems Get Disk

PLAINFIELD, N.J. — Lockheed Electronics Co., Inc. has enhanced its small business system III with the addition of a floppy disk.

The subsystem is said to be compatible with the IBM diskette and may be read or written by the IBM 3740 or 3600 subsystems.

The unit features a transfer rate of 250 bit/sec and an access time of 11 msec per track. It costs $3,675 from Lockheed in Plainfield, N.J. 07061.

Report Urges T/S Over Mini

WELLESLEY, Mass. — "Investing in your own computer — even a minicomputer — isn't always the answer to your data processing needs" is the warning issued by "Points to Consider Before Selecting a Computer," a free booklet available from Keydata Corp.

The firm, a commercial time-sharing service that also provides on-line business DP services to wholesalers, distributors and manufacturers, noted that "realistic estimates of the cost of installing a modest-size minicomputer range between $60,000 and $70,000, plus monthly charges."

Calling the purchase of an in-house system "a sizable risk many small companies don't want to take because computer failures can literally put small companies out of business," the firm urged users to consider on-line time-sharing.

Software is the unpredicatble element in minicomputers, the report said. "When something goes wrong with a program after it is written or the software needs some other modification, only trained programmers can make the necessary changes," Keydata cautioned.

Producing applications software is a complicated matter, the report continued. "Minicomputers, because of their size and capability, actually require more complex programs than many large computers, and the development and debugging of this software is basically an operation performed by highly skilled programmer/technicians whose wage rates are continually rising," it said.

In the majority of cases, a minicomputer requires an operator. Since most businesses are dynamic, they require alterations in both hardware and software, necessitating the hiring of an outside software firm or the development of in-house technical expertise.

"Either option has its difficulties," the report said. "Many software firms make their profits from marketing computers rather than software. Thus their primary focus tends to be on developing software packages for new accounts, rather than maintaining software already installed.

"These firms have a high mortality rate, so there is no real assurance the one you select will be available continuously to handle your software requirements," the report added.

"On the other hand, finding and managing a good technical staff also presents problems because good people are in short supply becasue of the rapid growth of the industry."

The report offers a checklist of costs that are most likely to occur with the installation of an in-house system and covers some hidden costs, such as the cost of supplies, security, air conditioning, personnel support, parallel-operation equipment, documentation and hardware insurance.

The report is available from Keydata at 20 William St., Wellesley, Mass. 02181.

Adding OCR to Mini Speeds Remittance Task

EUGENE, Ore. — Optical character recognition (OCR) equipment hooked to a minicomputer has helped Liberty Communications here solve a complex remittance-processing problem.

The firm, a cable television company, previously gathered customer payments at 32 field service offices. The payments were then forwarded to a service bureau for processing, according to Carolyn Chambers, vice-president and treasurer of the company.

When a customer called in with a question concerning his bill, Liberty could not provide a quick answer because of the way the remittance processing was being performed, Chambers recalled. Sometimes it would take 15 days to bring the records up to date, she added.

A consultant, William T. Geoghegan, was hired to help find a solution to the problem and give the firm better control of its accounts.

After looking at various solutions, such as the possibility of having the customers send back coupons, both the consultant and Chambers agreed OCR would be the best solution.

Most OCR systems were too expensive or too complex to be cost-justified for use with the firm's minicomputer, Chambers noted.

From an advertisement and from an exhibit at the National Computer Conference, the company became aware of the Datareader from Key Tronic Corp. of Spokane, Wash. The firm purchased the system because of its low cost and the location of the vendor's manufacturing plant, Chambers said.

Liberty has over 100,000 customers geographically dispersed across the country who are billed on a bimonthly basis. The Datareader handles the entire remittance-processing routine.

Processing Routine

The application requires the scanning of a remittance payment stub printed in the OCR A font and the associated check. Two fields, the account number and amount field, are scanned on the remittance stub. This information is printed twice on the same scan band to ensure reading accuracy.

Upon receipt of the remittance document and check, the operator verifies that the amount due and the check amount match. Those that don't — about 2% — are set aside for manual key entry.

The operator then drops the remittance document into the top drop feeder and the check into the bottom of the duel-drop feed unit for scanning and processing by the Datareader.

If an error occurs, the Datareader automatically stops the processing operation, sounds an audible alarm, clears the data from its output buffer and does not transmit any of the data from that document to the CPU.

The operator will run the same document through an additional two times to make sure it cannot be read. If the document is still rejected, it is set aside to be manually entered:

Eighty percent of all documents are read on the first pass and 40% to 50% of the remaining documents are read on the second pass, giving the system a successful read rate of 90% to 95%, Chambers said.

Key Tronics standard check-processing routines are available for processing checks in this application. Chambers expects to process between 2,000 and 2,500 sets of documents per day at a 90% read rate with the single OCR unit. Liberty has purchased a second unit to accommodate its annual growth.

Liberty is using a Hewlett-Packard Co. 3000 series II computer as its processor. The Datareader with RS-232 interface is directly on-line to the asynchronous RS-232 I/O port on the HP 3000.

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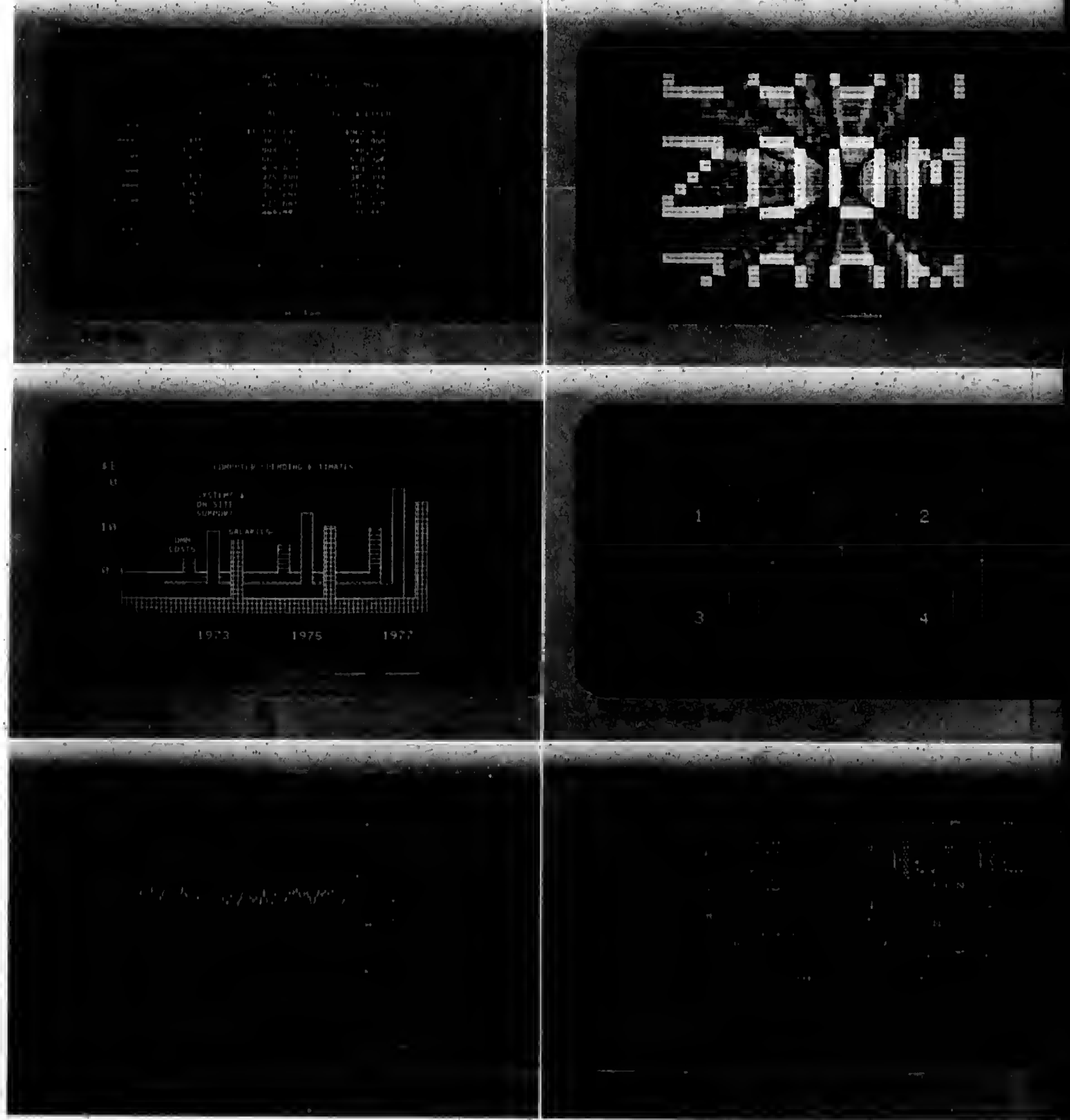

STC Turnkey Enhanced

PARAMUS, N.J.— Storage Technology Corp. (STC) has enhanced its turnkey minicomputer-based business system with the addition of'an English-like language that "allows a nonprogrammer to compeltely specify the requirements for new report programs in minutes."

The language, dubbed English 210, is said to be free-form and easy to learn. The operator responds to step-by-step prompting messages at the bottom of the CRT screen to define report parameters shown at the top of the screen.

Any turnkey systems delivered by the firm in the last 18 months which include the STC Double Precision Executive can be retrofitted with the language for $3,200, a spokesman said. Otherwise, the price is bundled into the turnkey price, he added from E-210 Rte.4, Paramus, N.J. 07652.

DEC Users Get Clock Boards

PALO ALTO, Calif. — Digital Pathways, Inc. has two battery-powered accessory boards that provide calendar and real-time clock functions for Digital Equipment Corp. PDP-11 and LSI-11 minicomputers.

The units keep track of the correct date and time even when the mini's power is turned off, a spokesman claimed.

There is no need for the operator to enter time or date information at any time, thus reducing the chance of error, he added.

The TCU-100 for the PDP-11 presents date and time when a read instruction is given by the operator. It can be preset to interrupt at specified times or regular intervals.

It can also be used to keep track of system downtime, even during power failures, the vendor said.

The TCU-50 unit for the LSI-11 lacks the interrupt capability.

Both of the units can operate without computer power for up to three months on built-in rechargeable batteries. Each unit is contained on an edge connector circuit board that plugs directly into one of the mini's accessory slots.

The TCU-50 costs $325 while the TCU-100 costs $495 from Digital Pathways at 4151 Middlefield Road, Palo Alto, Calif. 94306.

Minis Move Data Quickly

(Continued from Page 31)

ports such as trailer utilization reports and a pattern report which shows equipment types needed by "origin state" and "destination state" that attempts to point sales people to where potential customers are likely to be located.

A position report gives the operations people and management an overview of what's happening and "is in effect a kind of a quickie backup.

"We are in the process of making it possible for the second system to absorb the workload of the first system" should the first system go down, Guyton said.

To do this requires a bit more disk storage. "We keep the 25M-byte disk on the dispatch Reality quite loaded, and the 20M-byte disk on the other Reality can't quite hold the system."

Anticipating a new operating system release for the system, Guyton said that as soon as it is distributed "we are going to dedicate the tape drive on the on-line system and, as we update a record, we will pass the updated records out with a peculiar key right to tape.

"That way, if we have a failure of the primary sytem, we would simply load the preceding day's saved files; update the files from the transaction log and be back in business."

Management information is transferred daily to the NCR system through tapes, he noted.

Microdata takes care of the service of the system, he said; and "I have had absolutely no problem with it."

The new Hewlett-Packard Graphics Terminal uses a microprocessor and raster scan technology to combine high performance with low cost.

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Report From Datapro Details 144 Micros

By Frank Vaughan
CW Staff

DELRAN, N.J. — The microprocessor and its logical extension, the microcomputer, are still the most exciting technological aspects of the DP industry, according to a report published by Datapro Research Corp.

"And while these products continue to amaze us with their vendors' feats of packaging progressively greater performance into smaller packages...we are merely witnessing another cycle of technological innovation proceeding from its infancy, through the various stages of applicational discovery, into full maturity," the report said.

Entitled "All About Microcomputer Specifications," the report noted there is not too much difference between this year's microcomputers and last year's. Primary differences come in the form of fewer integrated circuit requirements and denser memories at lower costs.

Another development has been in the availability of specialized I/O interface circuits, such as diskette controller chips.

"By combining these innovations, the spectrum of microcomputer offerings has begun to take on the performance characteristics of small minicomputers in exactly the same way that the minicomputers have recently begun to function more like their larger mainframe counterparts," the report observed.

The report discusses microcomputer and microprocessor development systems and their outgrowths. It also looks at OEM and hobbyist microcomputers.

One trend that continues to surprise the industry observers is the rapid growth of the hobby interests, Datapro said. Starting with the Mits Altair 8800 (an 8080-based kit product) and followed by the Mits 680 and Southwest Technical Products Model 6800 (both 6800-based computers), the interest in home-built computer systems is expected to rival the interest in high-fidelity kits within a few years.

Several other companies have moved into this area and computer stores are springing up all around the U.S., the market research firm noted.

Micros in Detail

The Datapro report presents the characteristics of 144 current microcomputers from 57 manufacturers in comparison charts. The information is on systems that are currently being shipped or are scheduled to be shipped by the third quarter of this year.

All information was supplied by the manufacturers during April and May of this year, Datapro said.

The categories in the comparison charts include packaging, which includes the number of boards, board dimensions, total number of chips and information on the power supply, control console and cabinet; and the microprocessor, which includes manufacturer and model, technology, data word size, instruction word size, clock frequency, add time for register-to-register in microseconds per data word, number of instructions, total number of registers, microprogrammability and availability of hardware arithmetic.

Other categories include information on I/O control, software, principal applications, pricing and availability and comments.

A list of addresses and telephone numbers of manufacturers whose products are summarized is also included in the report, which sells for $12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Micro Bytes

Oliver Prom Programmer Handles TI 2708, 2716

N. HOLLYWOOD, Calif.— Oliver Audio Engineering, Inc.'s PP 2708/16 programmable read-only memory (Prom) programmer handles the Texas Instrument's 1K Model 2708 and 2K Model 2716 Proms.

The programmer contains address counters and timing and control logic and software. It also includes a power supply and case and five-ft cable, the firm said.

The unit can be connected with a parallel interface to a microcomputer.

The PP 2708/16 costs $249 in kit form and $299 assembled and tested from Oliver at 7330 Laurel Canyon Blvd., N. Hollywood, Calif. 91605.

Show Set in Boston

BOSTON — Computermania, a computer show for businessmen and computing enthusiasts, will kick off at the Commonwealth Pier here Aug. 25-27.

Featuring over 400 exhibits of computers, calculators, video games, video recorders, programs and accessories, Computermania will also include a display on ham radio by Tufts University.

Tickets cost $12 and can be obtained at the door.

Kit Backs Altair Clock

ALBANY, Calif. — Parasitic Engineering has a permanent fix-kit for the Altair 8800 microprocessor clock.

The fix-kit reportedly decreases the clock's susceptibility to noise, temperature drift and other component variations.

The fix-kit contains instructions, components and other necessary parts. It installs directly on the Altair microprocessor unit (MPU) boards.

The kit sells for $15 from Parasitic, which can be reached at P.O. Box 6314, Albany, Calif. 94706.

Reductions in 20% Range

Altair 680B, 8800B Prices Cut

ALBUQUERQUE, N.M. — The Pertec Computer Corp. has announced price reductions in the 20% range on a variety of Altair personal computing items.

The reductions were made as a result of "manufacturing efficiencies," according to a spokesman.

The 8800B microprocessor unit (MPU) in kit form was reduced from $875 to $750, while the assembled version with 12 board slots was cut from $1,175 to $995. The cost of the assembled version with 18 board slots was dropped from $1,250 to $1070.

The 8800B turnkey MPU in kit version was reduced from $995 to $795. The assembled 12-slot version of the turnkey was cut from $1,250 to $995, while the 18 board-slot unit was reduced from $1,395 to $1,070.

680B Kits Drop

The 680B microcomputer kit was lowered in price from $466 to $395 and the assembled model from $625 to $495. The turnkey kit form of the 680B dropped in price from $425 to $350, while the assembled turnkey went from $610 to $450.

The Altair line of microcomputers is sold through a network of Altair Computer Stores.

Midwesterners Set to Get Own Show

CHICAGO — Midwesterners will have a personal computing show of their own when the Midwest Personal Computing Show debuts here Oct. 27-29.

Attendees will have an opportunity to win a Processor Technology B-190 kit with 16K bytes of memory, a system worth more than $1,000, according to a spokesman for *Personal Computing Magazine*, sponsor of the show.

The show, which will be held in the Holiday Inn at O'Hare International Airport, will feature exhibits from programmable video games to inexpensive business management systems.

In addition to the product displays, a seminar program is being planned. The program will be of interest to entrepreneurs and businessmen who are interested in "getting a piece of the action in personal computing," the spokesman said.

Another event at the Chicago show will be "Everyone's Computer School." Conducted by Gene Murrow, president of Computer Power and Light, the "school" will teach the basics of programming to beginning users.

Participants will learn to program while sitting at a terminal, the spokesman noted.

Other seminars being planned include "New Approaches to Business Applications," "Introduction to Hardware," "Introduction to Software," "Computer Art and Music," "Computer Networks," "Computer Games of the Future," "Computing Is Schools," "The Home Computer — How Real is It?" and "The Threat of Government Intervention in Personal Computing."

The conference will conclude with a Saturday night banquet at the O'Hare Hyatt Regency Hotel.

Admission to the exhibit hall is $10. Additional information is available from *Personal Computing Magazine*, 401 Louisiana S.E., Albuquerque, N.M. 87108.

System Allows S-100 Vocal Input

LOS ALTOS, Calif. — A system compatible with S-100 bus microcomputers that provides voice input and control and reportedly replaces keyboards in many instances has been introduced by Heuristics, Inc.

Speechlab digitizes and extracts data from a speech wave form and applies pattern-matching techniques to recognize the vocal input, a spokesman explained.

Technically the system features 64 bytes of storage per spoken word and a vocabulary of up to 64 words in memory, he said.

Other features include real-time response, 95% correct recognition, hardware self-test capability and CMOS design, he claimed.

Software includes Speechbasic Basic programming language, an Assembly language speech-recognition program, Speechbasic plot, correlation, recognition and advanced recognition.

Speechlab is available for $249 in kit form and $299 assembled and tested. Included in the price is a complete hardware/software system, a 275-page laboratory manual, 95-page hardware manual, high-fidelity microphone and three programs on paper tape.

Heuristics is at 900 N. San Antonio Road, Los Altos, Calif. 94022.

Artec Board Goes to 32K

SAN CARLOS, Calif.— A memory board that can be built up in modular form to 32K bytes has been introduced by Artec Electronics, Inc.

The board is fully compatible with the S-100 data bus and speed-compatible with Zilog Z80-based systems, according to a spokesman.

The Model 32K-100 requires plus-8 single voltage only with a power usage of 3 amps, he said. Access time for the direct memory access (DMA)-compatible board is 250 nsec.

DMA compatibility allows users to access memory directly, without going through the microprocessor unit (MPU) on the microprocessor board, the spokesman explained.

The board, fully buffered on all address and data lines, also features battery backup to allow operation at reduced power consumption and a bank select provision permitting the selection of banks or blocks of memory to address.

The basic board with all support circuits, power regulator, 8K bytes of memory and assembly manual sells for $290. Additional 8K bytes of static random-access memory cost $255 each and a full 32K memory board sells for $1,055 from the firm at 605 Old County Road, San Carlos, Calif. 94070.

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Zilog Adds Three Boards

CUPERTINO, Calif. — Zilog, Inc., has expanded its series of Z80-based microcomputer boards by adding three programmer boards that allow users to program memory chips, according to a spokesman.

The Z80-PPB/Eprom Programmer Board was designed for programming 24-pin erasable programmable read-only memory (Eprom) chips of the 2708 or 2704 variety.

Another offering is the Z80-PPB/Prom programmer board for programming 16- and 24-pin Harris Corp. programmable read-only memory (Prom) chips of the 7620, 7621, 7640 or 7641 type.

Each board has software that permits users to program, verify, list and duplicate; each costs $475.

A composite version of the two boards is the Z80-CPB/-Prom. It duplicates the software capability of the other boards and costs $575.

Zilog is at 10460 Bubb Road, Cupertino, Calif. 95014.

Parasitic Kit Built on 8080

ALBANY, Calif.— Parasitic Engineering has introduced an 8080-based microcomputer kit that sells for under $700.

The Equinox 100, according to a spokesman, eliminates the need for binary lights and toggle switches with its use of a 12-pad keyboard and a numeric 7-segment display.

Through firmware control, Equinox 100 users can utilize the front-panel keyboard and display to monitor or alter any register, register pair, memory location or I/O device in the system, he said.

The microcomputer can single-step through programs, slow-step at a programmable rate from 1- to 64K step/min or HALT at predetermined points without "going to sleep," he claimed.

The complete kit sells for $699 from the firm at P.O. Box 6314, Albany, Calif. 94706.

Kit Fans: Are You There?

The age of the microcomputer kit has dawned and the do-it-yourself computer has attained a degree of respectability that has surprised many people.

The concept of building one's own computer holds a great deal of interest for hobbyists and professionals alike. If sales figures can be believed, quite a few kits are in various stages of assembly throughout the country.

If you have either joyously succeeded or miserably failed at building a kit — or if you fall somewhere in between — and would like to share some of your experiences, *Computerworld* would like to hear from you.

Drop a short line to Frank Vaughan at *Computerworld*, 797 Washington St., Newton, Mass. 02160.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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The New PCMs — Part 2

Microcode Seen Future Market Strategy

By Toni Wiseman
CW Staff

The ranks of plug-compatible mainframe manufacturers are swelling steadily as more and more vendors enter the market. Counterstrategies are expected from all sides — and a measured amount of retaliation is expected from IBM.

Just what the strategies of these plug-compatible manufacturers (FCM) will entail and how far they will go is open to conjecture. Industry observers, however, agree on one thing — microcode is going to play a large part in everyone's strategy.

Arthur D. Little's Frederic G. Withington said it isn't clear whether "the big guys are going to be able to fend off the little guys" by bundling systems programs through the use of microcode.

Amdahl Corp. in particular, he noted, is very imaginative, is spending money on R&D and will certainly have new hardware products. "And conceivably, with the help of Fujitsu, it may eventually be independent in software too, though that would be a long way off," he said.

"What we're seeing here is something that's never really forced itself on us before — the complete decoupling of software and hardware, with the operating system being the primary product, but being so big and so complex to change that it's vulnerable to attacks from every quarter," Withington stated.

The virtual machine concept is the way for mainframers to compete, according to Elinor Gebremedhin, project editor at Auerbach Publications said. She suggested that a viable strategy would be to design a machine in such a way that the user could put an operating system on it that would be effectively identical to the IBM operating system.

"Right now, mainframe manufacturers are tied up in their architecture design by the necessity to emulate their previous offerings," Gebremedhin said. "But they're freeing themselves from this constraint by developing the virtual machine. The problem is to do it efficiently enough to avoid performance degradation."

James Peacock, vice-president of International Data Corp., sees problems ahead for both users and PCMs as microcode and predesigned circuits handle more and more software functions. For this reason, he predicted, plug-compatible machines are only a short-term solution.

"Looking at it from the user's standpoint [plug-compatible CPUs] are a very good solution for users who are committed to IBM software, but this approach presupposes the availability of IBM software," Peacock noted.

This is the second article in a three-part series that takes a look at the competitive plug-compatible mainframe market.

Part 3 will examine the competitive scene from the viewpoint of securities analysts who follow the industry.

As hardware and software become more and more intertwined, a plug-compatible machine could create problems for the user who wants to keep up with IBM, he said.

"All that the PCMs are saying now is that if you're running IBM software, they can save you money on your hardware. If I, as a user, feel the system I have, or this type of system, is going to be adequate for the next five years, and I am willing to live with the type of software I have, then this looks like a very attractive approach.

"But if I am up against a wall, if I have problems that I don't think I can handle with the current architecture of the machine and I'm looking to IBM or some other manufacturer for a new solution, that's another story.

"In that case I wouldn't think I as a user would be very secure in going to an IBM-compatible machine, because I would think I wouldn't be able to get whatever IBM offers," Peacock explained.

Art Yerkes, Datapro Research Corp.'s mainframe editor, also believes the virtual machine is the likely strategy. With microprocessor machines it is entirely feasible, if somewhat difficult, to design a machine which could run

(Continued on Page 38)

Study Finds SBS-Type Ventures Need Large Infusions of Capital

By Toni Wiseman
CW Staff

PALO ALTO, Calif.— The telecommunications industry is characterized as being highly capital-intensive and requiring long-term capital investment — implications evident in the Satellite Business Systems (SBS) venture, according to Comquest Corp., a market research firm.

The partners in SBS — IBM, Comsat General Corp. and Aetna Life & Casualty — have projected expenditures in excess of $680 million by 1986, when the seven-year life of the first generation of satellites ends, Comquest said.

Of this amount, $250 million will be pre-operational expenses for the period up to July or August 1979. The remaining $430 million will be expended in the operational phase to 1986, the report said.

Approximately 60% of the total expenditures will be for plant investment, including satellites and earth stations; the remaining 40% will be for administration, marketing and other operating expenses, Comquest noted.

A more detailed breakdown from the firm showed 18.9% for the space segment, 12.8% for 5-meter antenna stations, 8.5% for 7-meter antenna stations, 1.4% for systems management facility, 16.8% for system development, 26.5% for administration and headquarters, 10.8% for operations and maintenance and 4.3% for spare parts.

Comquest analyzed the expenditures and revenue requirements resulting from the installation of 375 earth stations by 1983. "For a simplified break-even cash flow analysis through 1986, required average monthly revenues needed to accrue to SBS for each earth station would be $28,500," it reported.

In Comquest's estimation of SBS' break-even condition, the maximum negative cash position will occur in 1981, with net cumulative expenditures of some $330 million — 10 years after the founding of the original CML Satellite Corp. and six years after the founding of SBS.

"With all earth stations installed and producing revenue, the system revenues' requirement for break-even would be approximately $127 million per year.

"Assuming an income distribution from

(Continued on Page 38)

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Study Finds Communications Capital-Intensive

(Continued from Page 37)

both IBM services roughly proportional to demand for equivalent voice circuits, the annual system revenues for the breakeven case would be: low-speed data, $12.2 million; medium-speed data, $16.3 million; high-speed data, $35.8 million; voice circuits, $62.7 million," the report observed.

"With the revenue-producing features of demand assignment and voice activity compression, these numbers appear attainable for SBS when compared with private-line revenues for other domestic satellite operators," the report stated.

Entry into domestic satellite operation is theoretically open to any company which has the financial staying power and the available technology, Comquest indicated, citing Control Data Corp., Burroughs, Honeywell, Univac, NCR and possibly Memorex, Dataproducts or Ampex as potential candidates.

"In general, computer companies will be well-qualified technologically in the areas of digital signal and digital data processing. In addition to this technology, they will also require the satellite communications technology in order to even qualify for [Federal Communications Commission] (FCC) construction permits," the report stated.

This means a computer-based firm can either develop in-house capability or form a partnership with a communications-based entity, it noted. While Comsat-General is an obvious potential partner, RCA, Western Union and American Satellite Corp. are also viable, it added.

Satellite equipment manufacturers such as Collins Radio Group, Hughes Aircraft and ITT Space Communications are also possible partners for joint ventures, it said.

"Comsat-General's association with IBM would not necessarily rule it out as a venture partner with another computer manufacturer," Comquest observed. "However, Comsat-General's ability to take on the added financial strain is questionable.

"The financial investment for 'rooftop' satellite operation will probably incur a peak negative cash flow of $250 million to $350 million including space and ground segments."

Foot in the Door

Comquest suggested computer-based firms could get their foot in the door by using SBS' common carrier facilities as soon as they become operational — traffic SBS will be obligated to accept as a common carrier.

"This will allow experimentation with the direct transmission of high-speed data from computer to computer via satellite — without having to reduce to voice-band rates the multimegabit per second internal transmission rates of the computer," the report said.

What about IBM and its required "arm's-length" relationship with SBS?

At present 45 (51%) of the 88 members of the SBS staff are employees.

"This situation cannot be allowed to endure following FCC approval since no employees of IBM, Comsat or Aetna can be on the staff of SBS," Comquest said.

"Basically the FCC requirement is that IBM should be involved only in the policymaking process for SBS through the Partnership Committee. But IBM must be separated from the operational aspects of SBS.

"There is obviously a grey area where policymaking ends and operating procedures begin. This is likely to be a continuous bone of contention with the FCC;" the report stated.

CI Notes

Aetna Subsidiary OKs Participation in SBS

McLEAN, Va. — A subsidiary of Aetna Casualty and Surety Co. has initiated its financial participation in Satellite Business Systems (SBS) in accordance with the SBS partnership agreement.

Under the partnership agreement, Aetna, since the inception of the SBS partnership in 1975, has been paticipating with Comsat General Corp. and IBM as an equal partner in the management of SBS.

Initial financial participation by Aetna and continuing financial participation by Comsat General and IBM, however, depended on their determination that the SBS Order issued by the Federal Communications Commission last Feb. 8 provides a satisfactory basis for proceeding with the venture.

That determination has now been made, according to SBS.

IBM Starts New Division

ARMONK, N.Y. — IBM has established a General Technology Division in its General Business Group.

The division, which will be responsible for semiconductor development and manufacturing, includes the Burlington, Vt., components plant and laboratory and the Manassas, Va., components laboratory.

The company also announced the Manassas laboratory will be relocated to Burlington. Both facilities were previously part of the System Products Division.

The Federal Systems Division, principal occupant of the Manassas site, is not affected by the transfer.

Xerox Makes Offer for Shugart

STAMFORD, Conn. — Xerox Corp. and Shugart Associates have signed a letter of intent leading toward acquisition of Shugart by Xerox.

The companies expect to reach final agreement within 60 days and complete the transaction by year-end. No details were revealed except that Shugart would continue under its present management and be operated as a Xerox subsidiary.

Shugart manufactures rotating memories, including flexible disk drives, a business Xerox is already in through the manufacture of cartridge disk drives by Diablo Systems, Inc.

Microcode in PCM Future

(Continued from Page 37)

both IBM and non-IBM operating systems with interchangeable boards, he noted.

However, there is another problem on the horizon for PCMs. As more and more software functions are integrated into hardware, PCMs are going to be put in an impossible position, Yerkes said.

"I don't see IBM losing any money over counterstrategies, going into programs that are going to cost it money," he said. "But as it develops new products, it will look for alternatives through new technology that don't cost any more money but do ace out the others."

The more IBM puts the decoding right in the devices themselves — such as disk drives — so that decoding is done not in the CPU but at the controller interface level, the less PCMs will be able to follow, he contended.

To what extent will the giant do this? Yerkes doesn't believe IBM will completely "ace out" the PCMs because, he said, if IBM obliterates the PCMs, the Justice Department will surely close it down or break it up.

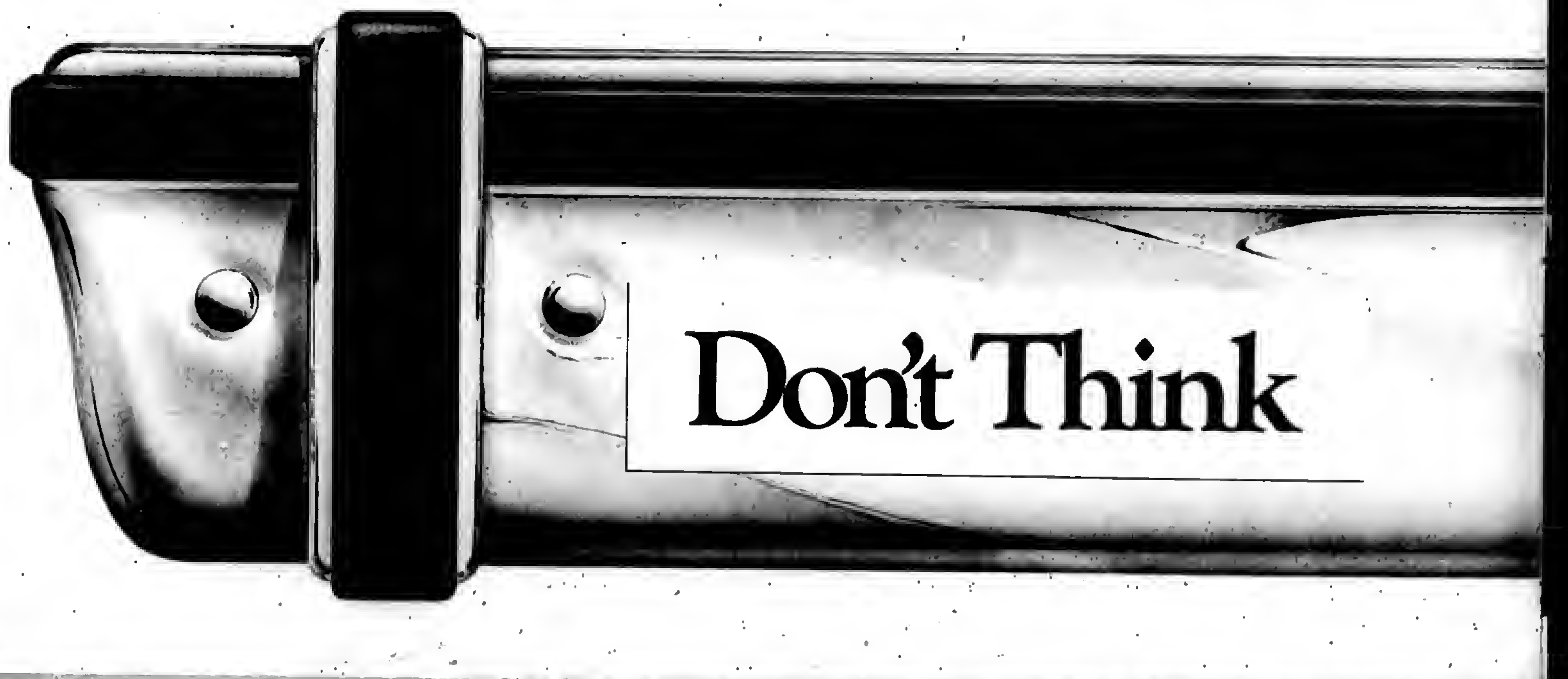
"I believe [IBM] will purposely leave enough margin in there for the PCMs just so its legal department can say, 'What do you mean we're a monopoly? Look at all those other people out there making money off our products.'

"IBM virtually needs the PCMs to make its case to the Justice Department," Yerkes said, adding he personally agrees with economist Alan McAdams, a U.S. vs. IBM trial witness, that IBM is a monopoly.

ADL's Withington noted that despite IBM's counterattacks on all types of PCMs in the past, "it's interesting they do still live. The better disk, tape and memory makers are still in business and they are making money.

"But they have been restrained by IBM to a position of perhaps tolerance.

"So if that's a guide, then the CPU makers may very well live. The question is, how much of IBM's market will they be allowed to take away?" Withington observed.



In Computer, Communications Industries

Capital Investment Funds Scarce, Congress Told

By Edith Holmes
CW Staff

WASHINGTON, D.C. – Money for capital investment has become as scarce a resource in the computer and communications industries as energy resources have become in the economy as a whole, Congress was told recently.

Speaking before the Joint Economic Committee's Subcommittee on Economic Growth and Stabilization, the Computer & Communications Industry Association (CCIA) warned the availability of capital will affect the way these industries continue to develop.

Captial requirements over the next five years for companies making small computers are estimated at $500 million and for companies making larger mainframes at over $1 billion, excluding the needs of IBM.

Further, the CCIA noted the microcomputer industry — spawned from earlier risk investments in the semiconductor industry — requires $400 million in outside capital for sustained growth between now and 1982.

CCIA President A.G.W. (Jack) Biddle was joined in the industry presentation of capital problems by Ryal R. Poppa, president and chief executive officer of Pertec Computer Corp., and Erwin Tomash, chairman of the board of Dataproducts Corp.

Together, these industry representatives called for Congress to establish a graduated corporate income tax, deductible expense treatment for dividends and a return to lower taxation of capital gains.

Poppa told the committee "the corporate tax rate of 48% hits the small and medium-sized corporate taxpayers and giant taxpayers alike." He argued the same principle of fairness and equity expressed in progressive personal tax rates should be carried over into corporate taxation.

Companies in their early growth years face heavy start-up costs and elusive profits, Poppa explained. "If smaller companies were taxed at a lower rate, retained earnings in the earlier years would be healthier and more stable, thus forming a more reliable source of internal financing to ensure their early growth periods."

Progressive Taxation

Poppa provided the subcommittee, which is chaired by Sen. Lloyd Bentsen (D-Texas), with a sample of a progressive tax rate schedule graduated according to a corporation's ability to pay. Under his proposed tax schedule, for example, a company with pretax income up to $50,000 would be taxed at a rate of 20%.

A company making between $350,000 and $400,000 would pay the government at a rate of 27%; the firm with an income of between $500,000 and $1 million would pay between 30% and 35%; and the corporation making over $500 million annually would be taxed at 70%.

Poppa also urged the retention of domestic international sales corporations (Disc) for small and medium-sized companies.

While noting Sen. Edward Kennedy's (D-Mass) condemnation of Discs as a "billion dollar annual giveaway to upper levels of the Fortune 500," Poppa argued smaller U.S. businesses need Discs to maintain their export operations.

Poppa suggested the subcommittee ensure against misuse of Discs by "limiting Discs to small and medium-sized corporations — those with capital accounts under $200 million — or by limiting the deferral permitted a given corporation in accordance with its capital account."

Tomash focused on the need to bolster the "faltering equity market. The Tax Reform Act of 1976, with its minimum tax and tax preferences provisions relative to captial gains, has all but eliminated reasonable after-tax rewards for the private investor," he said.

Rather than eliminate all special capital gains treatment, he urged President Carter act "to provide incentives for continued and new investment in our nation's industries."

Double Taxation

The elimination of double taxation of dividends would also provide some relief, Tomash said. However, "such tax reform would tend to benefit only the larger companies that are able to pay dividends.

"Certainly, if dividends were treated as a deductible expense, as is interest on borrowings, equity capital would be more competitive with debt equity," he continued.

But "we cannot trade capital gains reform for the elimination of double taxation of dividends," Tomash told the subcommittee. "The elimination of favorable treatment of capital gains would further isolate the small- and medium-sized companies from the capital market and, with dividend deductions available to larger companies, the capital drawing power of the large corporation over the financial markets would be assured."

System Coming

SAN ANTONIO, Texas – Datapoint Corp. is expected to introduce a small business floppy disk-system with a price tag of under $6,000 next month.

According to industry sources, the 32K system will include a microprocessor CPU, 32K of memory, a CRT and two diskette drives for a total storage capacity of 500K bytes.

The system is said to be compatible with the rest of the Datapoint family of systems and will run two jobs concurrently. It will be sold on a purchase-only basis.

Confabs Slated This Week

SigCPR to Meet

ARLINGTON, Va. – The 15th annual conference of the Association for Computing Machinery's (ACM) Special Interest Group on Computer Personnel Research (SigCPR) will be held here Aug. 18-19 at Stouffer's National Center Hotel.

Keynoting the national conference on team dynamics in systems development and management will be Gerald M. Weinberg, author of the *The Psychology of Computer Programming.*

Dr. Thomas W. Plum of Yourdon, Inc. will speak on innovative team concepts while Paul Oyer, president of the Federal Automatic Data Processing Users Group (Fadpub), will chair a panel on "Organizational Dynamics: How About Teams of Teams?"

Twenty-one papers will be presented in six sessions.

The registration fee for the conference is $75, with reduced fees of $60 for ACM or SigCPR members and $25 for full-time students.

Further information is available from the conference chairman, Fred Harold of the U.S. Civil Service Commission, Washington, D.C. 20415, at (202) 632-5650.

CCIA to Gather

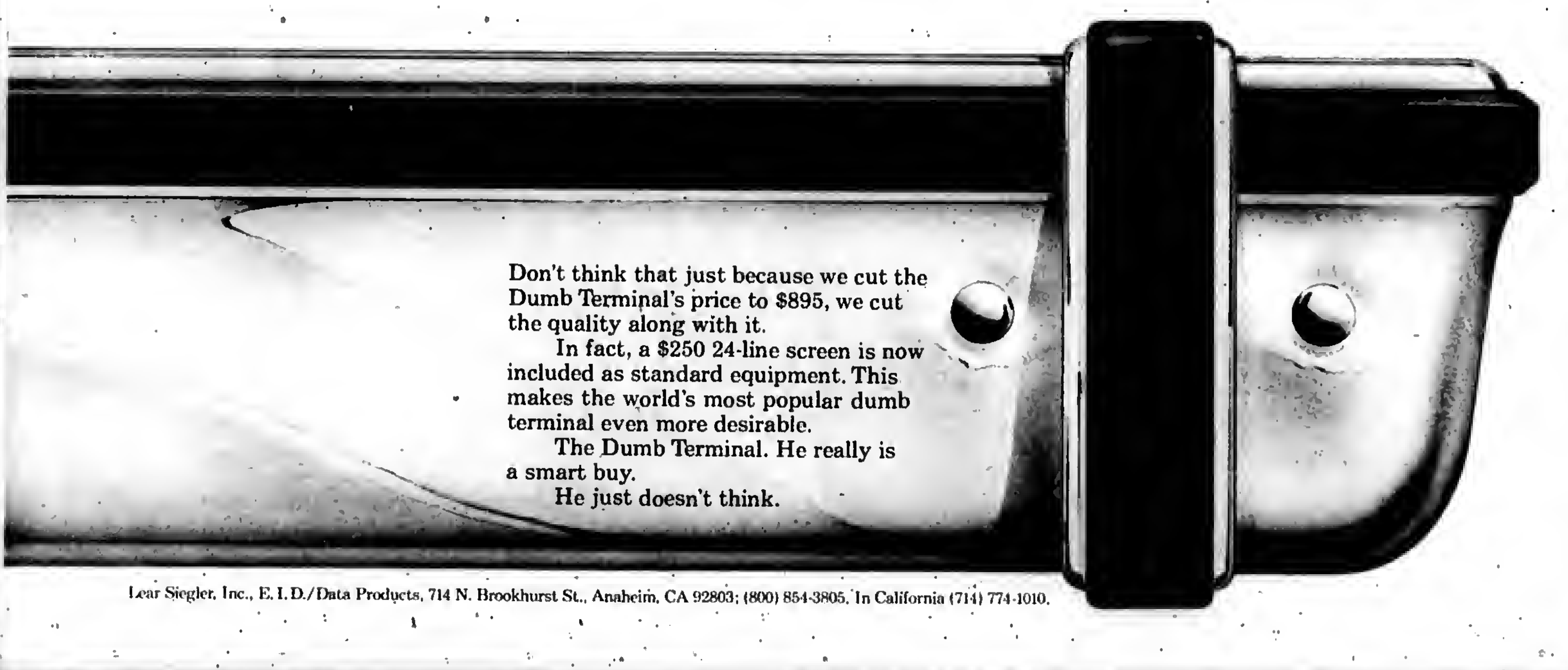
CHICAGO – Harry Newton, an independent telecommunications marketing consultant and writer, will be a guest speaker at the Computer & Communications Industry Association's (CCIA) fifth annual meeting Aug. 18-19 at the Hyatt Regency here.

Newton will deliver an address on "Success and Failure in the Telecommunications Industry: How to Achieve One and avoid the Other."

Also speaking at the meeting will be James Peacock of International Data Corp., who will discuss his "unpublished" insights into and analyses of the implications of recent IBM product announcements and pricing.

Finally, the CCIA meeting will include an overview by Dr. Les Gunderson, technical director of Corning Glassworks Telecommunications Products Division, on the potential of fiber optics technology.

These sessions are open to industry chief executives who are not CCIA members but wish to attend. The CCIA is located at Suite 512, 1500 Wilson Blvd., Arlington, Virginia, 22209.



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Sweda Expands Paper Tape Offerings

OEM Products

PINE BROOK, N.J. — Several paper tape devices have been unveiled by Sweda International. Additions to the Roytron line of desktop units include three models in the Series 1560 combination reader punch line; a Series 1060 punch-only unit and a Series 1250 reader-only unit.

Other introductions include a paper tape rewinder and a winder.

The Series 1560 punches 5- to 8-level tape at 60 char/sec and reads at 240 char./sec in synchronous mode.

The models 1560-AS and 1560-T have RS-232C-compatible interfaces. The 1560-AS was designed to operate with a terminal device on the same serial data lines while the Model 1560-T was designed to simulate a terminal device and uses a dedicated serial port.

The two versions of the Series 1060 punch-only unit, the 1060-AS and the 1060-P, have a RS-232C-compatible interface and a parallel TTL-level interface respectively.

The Model 1250-P can be slewed up to 240 char./sec. The 1250-AS generates data up to 2,400 bit/sec, the firm said.

The Model 92-C is a self-contained desktop paper tape rewinder; the Model 94 winder attaches to the punch housing.

OEM discounts apply to the products, Sweda said. Prices per single unit are: Model 1560-P, $1,695; Model 1560-AS, $2,250; Model 1560-T, $2,195; Model 1060-AS, $1,550; Model 1060-P, $1,295; Model 1250-P, $1,250; Model 1250-AS, $1,350; Model 92-C, $110; and the Model 94, $98.50.

Sweda International's OEM Products Division is at 34 Maple Ave., Pine Brook, N.J. 07058.

Drive Bows

MINNEAPOLIS — Control Data Corp.'s Model 9406 flexible disk drive handles double-sided, single- or double-density IBM-compatible diskettes and provides unformatted storage capacity of 1.6M bytes, the firm said.

The Model 9406 supports formats in either hard- or soft-sector operation.

CDC has also introduced the Model 9474 drive subsystem which accommodates up to four drives in a configuration with up to 6.4M bytes of unformatted capacity.

The 9406 operates with data formatting and timings resident in the host controller, CDC said.

Access time for both single- and double-density versions of the disk is 6 msec track-to-track; the recording density is 48 track/in., the firm said.

The Model 9474 uses the Intel 8080 to control drive operations.

Single units of the two-sided CDC 9406 cost $775, about 25% higher than the single-sided CDC 9404.

A Model 9474 subsystem with controller ranges in price from $2,600 for a single-drive configuration to $5,200 for four drives. Quantity discounts are available.

Tandon Adds Ferrite Head

CHATSWORTH, Calif.— An IBM-compatible double-sized ferrite recording head for floppy disk drives has been developed by Tandon Magnetics Corp.

The Series 200 is compatible with the IBM-type swing arm assembly which facilitates loading and unloading of diskettes, the firm said.

The heads meet the requirements of double-density recording, feature tunnel erase and have the same electrical characteristics as industry-standard, single-sided heads, a spokesman added.

Tandon will supply the double-sided heads unmounted or mounted and aligned in an OEM's carriage. The design allows loading of the two read/write heads simultaneously on both sides of the disk.

The heads cost under $50 in OEM quantities from Tandon at 20731 Prairie St., Chatsworth, Calif. 91311.

Tandon Series 200

Gulton Printheads Handle Mixed Data

METUCHEN, N.J. — Gulton Industries, Inc.'s DM1099 and DM10101 thick-film dot-matrix thermal printheads permit simultaneous printing of analog, graphic and alphanumeric data, according to the firm.

Each printhead contains a single continuous row of printing elements on a pitch of 50 point/in. Each dot is composed of two halves printing parallel.

The DM10101 contains a total of 101 dot elements where the 101st dot is for applications requiring both a zero and 100th data point. The DM1099 contains 99 dot elements to be used in conjunction with the DM10101 for data expansion.

Units are priced at $121.20 in single quantities through $75.75 in the 100- to 499-unit range from Gulton's Hybrid Microcircuit Department, 212 Durham Ave., Metuchen, N.J. 08840.

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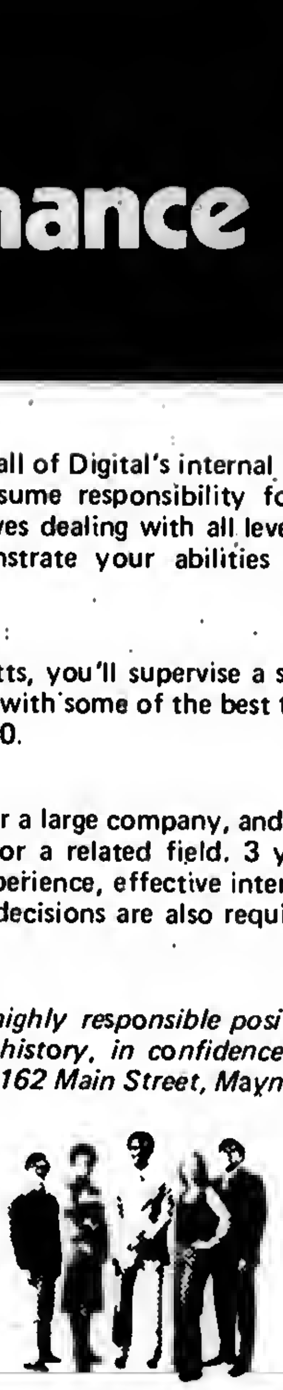

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Data Processing Division
Community Services Department

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PROGRAMMER/ ANALYST

Opening for Programmer with 3 years experience including 1 or 2 years in Analysis. Hospital background a plus. On-line experience, MUMPS or ASSEMBLER background required. Attractive salary and benefit program. Send resume or call:

MOUNT SINAI HOSPITAL
Personnel Services
500 Blue Hills Ave.
Hartford, CT 06112
(203) 242-4431-Ext. 4583

An Equal Opportunity Employer

First of a Series of Six

Motivation Opportunity New Challenges Excellent Benefits YES!

We have positions available in every area of data processing. So, if the above interests you, call us toll free: 800-543-7583, or

send your resume to:

ALLEN SERVICES CORPORATION
DAYTON AIRPORT OFFICE
212 West National Road, Vandalia, Ohio 45377
In Ohio Call Collect: 513-890-1200

An Equal Opportunity Employer M/F

Senior Systems Analyst

Hughes' Computing and Data Processing Department has a requirement for an individual with a strong background in systems analysis, specification and design.

Experience must include:

- Problem definition, feasibility analysis, and economic justification.
- Preparation of user requirements specifications.
- Specification and design of on-line and interactive systems including the use of IMS and S2K Data Base Management Systems and Data Communications.
- Hardware evaluation and selection (for particular application) ranging from small-scale, stand-along, mini computers to large-scale, main frames.
- Software package evaluation and selection.

The individual we are seeking will have a combination of technical, business, and interpersonal skills, coupled with maturity and sound judgment. These skills should encompass:

- Ability to provide an effective link between the user and data processing communities.
- An indepth knowledge of the broad range of user disciplines found in an aerospace company.
- Familiarity with a broad range of hardware, software, and programming languages.
- Good oral and written communication skills.
- A sense of urgency in keeping current with data processing industry technological developments.

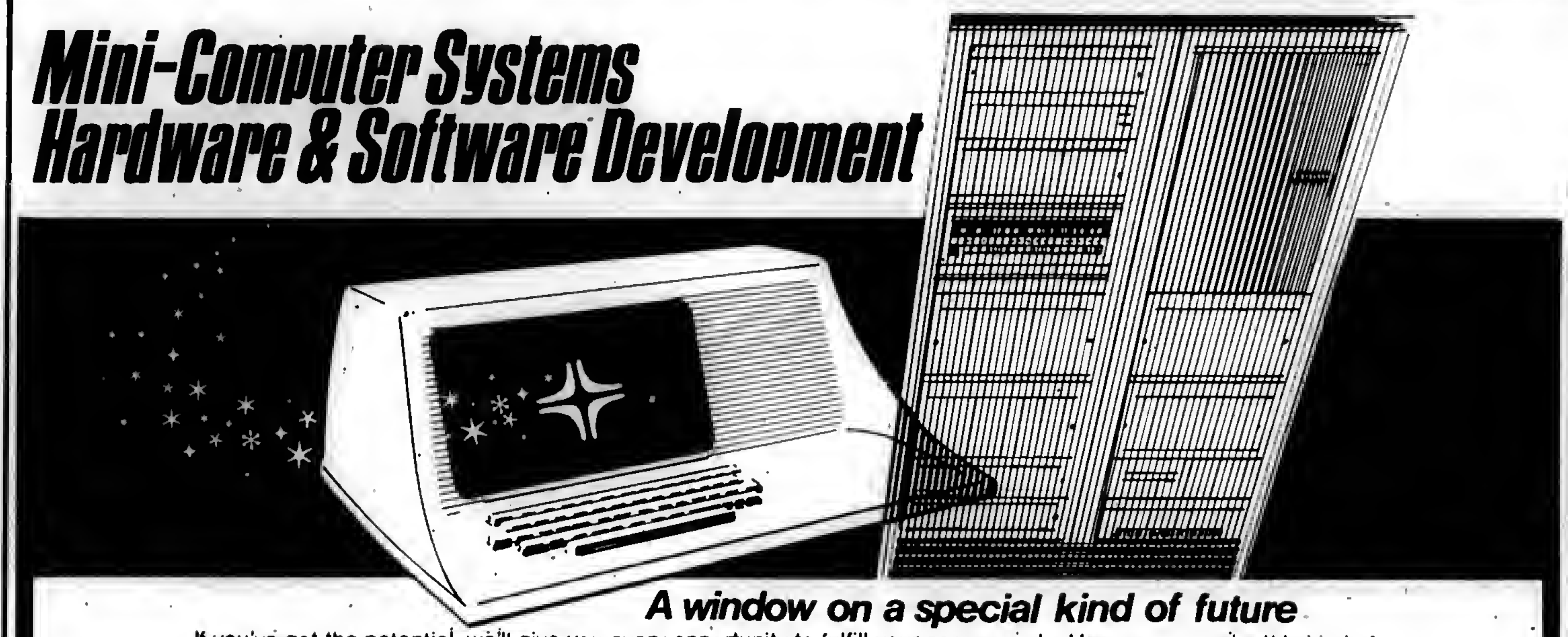
If your experience and interest match these requirements, please send your resume, including salary history to: Professional Staffing, Support Systems Division, P.O. Box 90515, Los Angeles, CA 90009.

U.S. citizenship required
Equal Opportunity M/F/HC Employer

HUGHES

HUGHES AIRCRAFT COMPANY

Mini-Computer Systems Hardware & Software Development



A window on a special kind of future

If you've got the potential, we'll give you every opportunity to fulfill your career goals. How can we make this kind of promise? Easily! We intend to double in size within the next year, and this kind of expansion means ground floor opportunities. We have a virtual abundance of openings for top talent in the following areas:

DEVELOPMENT ENGINEERING

Computer Development Engineers

Responsibilities will include the digital design and checkout of high performance mini-computers and I/O processors. Positions require a BS or MSEE and a minimum of 2 years experience in microprogrammed CPU design utilizing high speed TTL logic. Specific experience in memory management and channel design is necessary; a good working knowledge of computer architecture is preferred.

Controller Development Engineers

Individuals will be responsible for the design, implementation, test and release of high performance, low cost microprogrammed controllers. In addition to a BS/MSEE, experience must include 2-4 years of computer and digital systems design utilizing high speed TTL logic to develop any or all of the following: Arithmetic unit design, memory management unit design and data communications (bit-oriented protocols).

Circuit Design Engineers

An immediate need exists for Senior Circuit Design Engineers with the experience and ability to resolve significant analog problems. Must have the experience in designing switching power supplies, high speed BUS, A to D, D to A, converters and modems. Significant experience in worst-case design techniques, computer-aided design, stability analysis and a BS/MSEE degree is a must. Demonstrated ability to supervise other engineers and technicians is desirable.

Sustaining Engineers

Positions are responsible for sustaining standard hardware products by generating cost improvements and performance enhancements. A BSEE along with a minimum of 2 years experience in sustaining or product design is required, including computer and system design, competence in complex circuit-system design utilizing worst-case design techniques, computer-aided design analysis, and software test equipment troubleshooting techniques.

SOFTWARE DEVELOPMENT

Transaction Teleprocessing

BS Computer Science or related degree and a minimum 3 years experience in any of the following: On-line teleprocessing systems, Data Base management systems recovery, performance analysis/measurement and/or Data Communications, i.e. bit-oriented communications link protocol (SDLC, UDLC, HDLC). Individuals will have responsibility for any number of development projects.

Language Design

Openings exist in Data Base and compiler (COBOL) development. Minimum BS Computer Science or equivalent and 4 years experience in (1) the development of Data Base management systems and/or the design of INQUIRY/UPDATE/REPORT systems to a data base and high level language, or (2) the design and development of language processors, especially COBOL.

Operating Systems

BS/MS Computer Science and a minimum 5 years experience in the design and development of data communications, software for operating systems. Specific experience must include ASYNC-BISYNC line and network protocols, (SDLC, UDLC, HDLC). Individuals must have the ability to conceptualize to the extent of pushing the "state-of-the-art".

Diagnostics

We need professionals with a minimum 5 years experience in assembly language programming, preferably with mini-computers. Individuals will have project responsibility for the development of systems level testing and fault isolation software.

Software Enhancement

Positions require BS Computer Science or equivalent and a minimum of 2 years experience on mini-computers with primary emphasis in coding of operating transaction systems and/or the identification, resolution and implementation of enhancements to all systems software. Strong background in assembly language programming necessary.

SYSTEMS PROGRAMMING

Applications Development

6-12 years experience in the following areas is required: Evaluation of customer RFQ/RFP packages, proposal preparation for custom software systems, preparation of estimates for the development of custom software packages, design and implementation of applications software packages. Technical expertise is required in communications, distributive processing, data base design, commercial real-time systems, and software development for mini-computers. Language experience should include assembly language on a mini-computer as well as at least one high level language (FORTRAN/COBOL).

Data Communications Applications

2-6 years experience in communications with commercial transaction-oriented systems using on-line teleprocessing monitor controlling IBM 3270 or compatible equipment. Mini-computer assembly language programming is required. Individuals will work on the development of a special purpose teleprocessing monitor.

Message Switch

Challenging positions are available for Senior Programmers with 1-3 years experience with assembly language on mini-computers. Job responsibilities are to learn and maintain our message switch product. Experience in communications/message switching is a plus.

Specials Diagnostics

We are seeking individuals with 3 or more years of experience in assembly and higher level programming languages (FORTRAN/COBOL). Knowledge of real-time systems programming is required, with experience in data communications and/or diagnostics being highly desirable.

MANAGEMENT SYSTEMS

Business Systems Analysts

Immediate openings exist for individuals with a minimum of 3 years experience in programming and systems analysis for business systems applications. Previous experience is desired in a wide variety of on-line, data-base applications in marketing, manufacturing and finance. Thorough knowledge of COBOL is required, and familiarity with mini-computers is desirable.

MARKETING SUPPORT

Software Application Analysts

Our Headquarters Marketing Support Organization which is involved in customer interface with pre and post sales support, seeks both Junior and Senior level individuals with an appropriate college degree or minimum of 3 years experience as a Systems Programmer or Field Analyst with expertise in the following: Operating Systems, Telecommunications, Data Base Systems design and high level languages. Previous experience involving customer and sales engineering interface desirable.

Please send your resume in confidence to Art Ruben.

SPERRY UNIVAC
COMPUTER SYSTEMS

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, California 92664

An equal opportunity employer M/F

MAKE THE RIGHT MOVE

You're time is now. You've paid your dues and you're ready for the next step. You can be sure that step is in the right direction with Teledyne Brown Engineering. A well established company in Huntsville, Alabama, Teledyne Brown has several openings for experienced data processing professionals.

PROGRAMMERS

You'll be developing simulation, data reduction, and test control software on large mainframes and minicomputers. A B.S. in Computer Science, Physics, or Engineering and at least five years of programing experience including work in assembly language are prerequisites for success.

TEST PLANNERS AND DATA ANALYSTS

As testors, you'll plan software tests and analyze resulting test data. A B.S. in Computer Science, Physics, or Engineering and a minimum of three years experience in testing large real-time software packages are musts.

SYSTEMS ANALYSTS

You'll be analyzing hardware architecture and systems performance, writing high level requirement specifications, and projecting future technology requirements. A minimum of three years in designing processing algorithms and developing or analyzing processor system requirements and technology trends are critical. BS Computer Science, Physics, or Engineering required.

SYSTEMS SOFTWARE DESIGNERS

This is your chance to enter the stimulating world of computer graphics. Your work will include writing specs, designing, and developing interactive graphics on a mini. You'll also develop a high level simulation language compiler. A BS in Computer Science or Engineering and three years in systems software should back up your creative instincts.

DP METHODOLOGY DESIGNERS

If you have a knack for software efficiency, this is the spot. As our resident methodology expert, we'll be looking to you for strategies that optimize data processor designs and reduce related time and costs. Primary concentration will be on partitioning techniques for distributed systems, approaches to incremental development, specification languages, coding practices, Science, Physics, or Electrical Engineering, coupled with experience in data processor and software engineering research, we'd like to discuss these opportunities.

Please call our Toll Free number 800-633-2090 Monday through Friday between 8 a.m. and 5 p.m. or submit a resume including salary history to the Personnel Department:

An Equal Opportunity Employer M/F

TELEDYNE BROWN ENGINEERING

Cummings Research Park
Huntsville, Alabama 35807

Programmer/Analyst

Join a leader in the Satellite Communications Industry.

Ford Aerospace & Communications Corporation is in need of a Programmer/Analyst with a thorough knowledge of COBOL and a broad background in business systems analysis and design. The position presents the challenge of breaking ground in new integrated systems development. Experience in manufacturing and material with emphasis on data base management and on-line systems is particularly desirable.

Applicants should have a BS or equivalent and 4 or more years' experience in systems design.

Grow with the industry in a dynamic atmosphere. We offer excellent salaries and fringe benefits including 100% PRE-PAID tuition. For consideration, send resume with salary history/requirements to Professional Staffing, BN-9;

Ford Ford Aerospace & Communications Corporation

Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303

An Equal Opportunity Employer M/F.

Performance Measurement Distributed Systems

San Francisco Peninsula

HP's General Systems Division R&D lab seeks a well qualified Computer Scientist/Electrical Engineer with professional interest and experience in the area of computer systems performance measurement as applied to data communications hardware and software products. The successful candidate will be working closely with experienced product development team in the following areas: HP distributed systems networks; HP to IBM communications; terminal intensive systems; communications processors/controllers; and network management products. Prior experience with the techniques and tools useful in performance measurement, analysis and specification in a general purpose multi-programming system environment is a requirement. Interest in communications network analysis is also highly desirable.

If you hold preferably an MS degree in Computer Science or Electrical Engineering, have 2 or more years' experience in the performance measurement environment, and desire to join a R&D team oriented toward technical contribution in the fast growing distributed business systems market place, then HP wants to discuss with you the significant role you can play in our distributed processing product development program. Send your resume in confidence to Hewlett-Packard, General Systems Division, 5303 Stevens Creek Blvd., Senta Clare, California 95050. We are an equal opportunity employer dedicated to affirmative action.

HEWLETT hp PACKARD

SYSTEMS ANALYST

The national corporate computing center at a large growing Spokane, Washington multi-industry firm has an immediate opening for a systems analyst. Must have experience in and understanding of total integrated on-line systems concepts, be able to design, direct, and implement such development, and have outstanding communications abilities. In addition, strong accounting and programming background a must. Please send resume, salary history, and salary requirements to:

Personnel Department
P.O. Box 2727
Spokane, WA 99220

Equal Opportunity Employer

DATA BASE ADMINISTRATOR

Due to a promotion, Metropolitan Dade County Data Processing is looking for a Unit Administrator for Data Base Administration capable of directing the activities of senior data base analysts and programmers developing data bases for information systems in Criminal Justice, Human Services, Geographic and Physical and Economic applications.

The individual we are seeking must have heavy data base and project management experience working with the user, preferably in a large scale IBM installation operating under OS, SVS, VS1, or MVS in a SYSTEM 2000 environment using CICS.

We offer the challenges and diversity of informational requirements in metropolitan government, the rewards of a career in the public service, the advancement and training opportunities of a rapidly growing organization and competitive salaries up to $24,412 per annum. Must relocate to Dade County, Florida. Salaries commensurate with experience.

Send resume to: Manuel Garcia
Metropolitan Dade County
Data Processing Division
1351 NW 12 Street
Room 908
Miami, Fla. 33125
(305) 547-7033
EOE

CAREER OPPORTUNITIES IN ADP

Los Alamos Scientific Laboratory

The University of California's Los Alamos Scientific Laboratory, a multi-faceted national R&D facility, is seeking experienced professionals to work in its Administrative Automatic Data Processing Department, which provides Laboratory wide computer services for administrative and business applications.

MINICOMPUTER APPLICATIONS SPECIALIST

Will work with administrative minicomputer system, assisting users in software selection, system installation, and system maintenance; and assisting in the development of administrative minicomputer applications. Some work with large-scale machines also required. B.S.-M.S. (preferably in a quantitative discipline) or equivalent experience and exposure to hardware evaluation desired. Two years software design and development experience and a working knowledge of at least two computer languages preferred. The applicant should also display a record of successful professional performance and a capacity for accepting increased responsibility. Good communication skills essential.

ANALYSTS/PROGRAMMERS

Will design, write, and maintain computer application programs that provide information for Administrative Services. Includes preparation of narrative system proposals, programs, procedures for machine operations, and user documentation. At least three years' experience in COBOL and business systems design required. Preferred qualifications: B.S.-M.S. in information systems, or related field, and experience in Data Base Managements Systems (S2K), CDC-6000 series hardware, and minicomputers for business applications.

The Laboratory, located in the beautiful mountains of northern New Mexico, offers excellent working conditions and benefits, such as professional growth opportunities and 24 days' annual vacation. Los Alamos provides a pleasing lifestyle with small-town friendliness, abundant recreational opportunities, and an excellent school system.

Send complete resume, in confidence to:
Patricie D. Beck, Recruiting Representative
Division - 77-AO
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

los alamos
SCIENTIFIC LABORATORY
OF THE UNIVERSITY OF CALIFORNIA

An Affirmative Action/Equal Opportunity Employer
Women, Minorities, Veterans and Handicapped Urged to Apply.
U.S. Citizenship Required

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Newton MA 02160

CIRCULATION DEPARTMENT

COMPUTER SYSTEM HARDWARE INSTRUCTORS

Career opportunities exist with Herris Corporation. Our fast growing division, the Computer Systems Division, situated in Fort Lauderdale, Floride has the above instructor positions immediately available.

The individuals we seek will have responsibilities in the development, documentation and presentation of computer system hardware courses. Participation in training media and methodology for development of new courses are required.

We prefer experienced hardware instructors having a minimum of 4 years class exposure in microprocessors and communications. These positions lead directly toward careers in-house or toward other marketing divisional and field related responsibilities.

Send your resume in complete confidence to J.D. Jones, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Ft. Lauderdale, Florida 33309.

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

ANALYSTS PROGRAMMERS

All fees paid. No contract or application required.

Positions nationwide, especially Southeast. This is partial list, many others available.

SR. SYS. ANAL To $25K
Program leader in accounting related to IBM environment.

SYS ANALYST To $20K
CICS experience-several openings.

ANALS & PROGS To $25K
Casualty insurance experience-several openings.

ANALYST/PROGS To $20K
Credit card experience, project leaders & other openings.

EDP AUDIT To $23K
Several openings, some prefer accounting/CPA experience, some heavy DP.

SR. ANALYST To $20K
Manufacturing environment, DBOMP, MRP desirable.

MINICOMPUTER NETWORK ANALYST to $25K
Establish mini network, define standards.

ON-LINE ANALYST To $25K
Manufacturing environment, mini, CICS, or other major on-line experience a plus.

Current employment will be protected. Send resumes, including present and desired salary and relocation preferences to: JIM STAAL, Mgr. Information Systems Division.

Whitlow & Associates

[illegible]
[illegible]
[illegible]

Senior System Firmware Design Engineer

Amdahl has a lot to offer good people ready to take a positive step toward upgrading their careers and work environment. You will find the enthusiasm, excitement, and friendliness contagious. You might even find your work being fun, as most of us do.

Qualified candidates should have IBM O/S internals experience (MVS and VM preferred) and/or firmware design and development experience, or hardware development experience. Requirements include an MS in Computer Science or an EE and 5 years' experience. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

amdahl

Computer Marketing Professionals...

Digital's Laboratory Data Products Group Means Exceptional Opportunities For You!

One of the major product line groups within Digital Equipment Corporation, Laboratory Data Products, is responsible for developing and marketing products for systems applications use in direct and experimental research. Our markets are located in all segments of the medical and research community, including the Federal government, universities, and private researchers.

Three exceptional opportunities are now available, all offering broad corporate exposure and potential for increased responsibility and growth, and a chance to broaden your professional perspective by working in a dynamic environment with a group of diversely talented individuals.

Industrial Research & Development Marketing

This high-visibility position requires an aggressive self-motivated individual who can handle a new marketing responsibility for the industrial R&D markets, one of the newest and fastest-growing application areas for minicomputer systems.

You should be capable of investigating, identifying, and developing plans and strategies for increased market penetration including penetration of the international marketplace. Working with a significant amount of independence, you'll also support the sales force when requested, including field presentations. Obviously, excellent interpersonal skills are essential.

A technical degree or equivalent with at least 2 years thorough exposure to industrial market research, preferably in engineering or chemistry, and a solid familiarity with minicomputers are required. Sales and/or marketing experience is a definite asset.

Federal Government Marketing

If you have experience in direct sales or marketing to government agencies, this newly created opening is an excellent opportunity to utilize it.

Your primary responsibility will be to provide the marketing emphasis necesasry to increase marketplace penetration in scientific systems sales to the Federal government, one of our largest marketplaces. Duties will also include preparing short and long term marketing plans, representing the group on corporate committees and in meetings with our Federal National Sales Group, and providing support to the sales force as needed.

We require successful experience in government scientific sales and/or marketing, preferably in minicomputer systems. An engineering or scientific degree or equivalent is also necessary for this growth and advancement opportunity.

Minisystems Marketing

We're seeking a professional who combines technical knowledge with business acumen to help run the minicomputers marketing group within Laboratory Data Products. You'll be involved in the daily business decisions as well as the development of strategies for short and long term product development, and will have an excellent opportunity to grow into managerial responsibilities.

Other duties will include sales support, short and long term forecasting, new product development studies, and competitive analyses.

You must have 3-5 years experience selling or marketing minicomputers, preferably to the scientific marketplace, and a technical degree or equivalent. An MBA is preferred.

These positions are based in Digital's Marlboro, Massachusetts facility, a 40 minute drive from Boston.

Marlboro and its surrounding communities offer you and your family an attractive residential lifestyle and convenient to the unsurpassed cultural, educational and recreational resources of the New England area.

If you are interested and qualified in these positions, please forward your resume COMPLETE WITH SALARY HISTORY to Douglas D'Agata, Digital Equipment Corporation, 200 Forest Street, Marlboro, Mass. 01752.

We're the company looking for people.

digital
digital equipment corporation

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SOFTWARE MARKETING OPPORTUNITIES

Value Computing Inc., a proven leader in the development and marketing of D.P. Operations Software Systems, is expanding its marketing force in the San Francisco, Chicago, and East Coast areas. Two types of positions are available now to the aggressive, self-motivated D.P. professional.

MARKETING REPRESENTATIVE

(Chicago & East Coast)

- DOS/VS Application or Systems Programming experience required.
- No sales experience necessary.
- Large client base and extensive prospect list.

BRANCH MANAGER

(S.F., Chicago, & East Coast)

- Proven D.P. sales experience required
- Moderate travel within territory
- Knowledge of D.P. Operations desirable.

We are seeking ambitious individuals who will be well compensated for perfomrance (Salary + Commission + Expenses + Bonus). Advancement potential in our dynamic company is excellent. Knowledge of IBM hardware is desirable. Don't pass up this opportunity to maximize your income. Please immediately send your detailed resume including salary history in complete confidence to: Carl Dreyer, Value Computing Inc., 4415 W. Harrison, Hillside, Ill. 60162 (312) 449-2200.

SYSTEMS PROGRAMMER

Our Corporate Data Processing Center, located in Fullerton, California, has immediate openings for Systems Programmers to become actively involved in converting our present system software to a new virtual system software in order to exploit the power of our recently acquired Amdahl 470V/6 computer. In addition, we are in the planning stage for installation of a data network capable of switching remote users to any of the several host systems located throughout Hughes Aircraft Company.

Positions exist for experienced persons in the following areas of expertise:

- On-Line Systems Programmers with experience on at least one of the following IBM Subsystems: ATS, IMS, System 2000 or TSO.
- Operating Systems Programmers/Analysts with experience in installation and support of the IBM MVS operating system. In particular JES 2/JES 3 or systems measurement and performance tuning.
- System Planners with experience in evaluation and selection of data processing equipment in the areas of: DASD Storage, Tape Storage, Mass Storage, Intelligent Terminals.

Applicants should have demonstrated ability to formalize evaluations and present alternatives to management.

Positions exist at all experience levels. Candidate selection will depend on experience, capability, and self-motivation.

Qualified applicants should send their resumes to: Professional Employment, Department N-1, Ground Systems Group, P.O. Box 3310, Fullerton, CA 92634.

HUGHES

HUGHES AIRCRAFT COMPANY

U.S. Citizenship Required
Equal Opportunity M/F/HC Employer

Educational agency needs three temporary interns to work in data processing office, familiar with OS, JCL, program skills COBOL, ANSI; preferably with one year of experience in IBM Systems 360/370-OS/MFT environment. Submit letter and resume by August 29, 1977 to: **Department of Higher Education, 225 West State Street, Trenton, N.J. 08625. Attention Personnel Office. An Equal Opportunity/Affirmative Action Employer**

VIRGINIA-MARYLAND

Proj. Leader (2)	to $24M
Sys. Analyst (2)	to $20M
Programmer/Anal (3)	to $19M
Lead Prog. (1)	to $18M
Programmer (4)	to $16M

We are currently staffing 4 major corps in Virginia, Maryland & Southern PA. Clients seek exp with large scale IBM OS with COBOL and/or ALC. Background in mfg, banking, or insurance appropriate. Relocation & all fees paid by client cos. Contact in conf. G. Nugent, EDP Specialist, (301) 296-4500.

FOX-MORRIS PERSONNEL CONSULTANTS
409 Washington Ave.
Baltimore, MD 21204

SR. PROGRAMMER/ANALYST

Position available with a major hospital system in the Baltimore-Washington area. Prefer 5 yr. exp., IBM 370, CICS & COBOL. Exp. at a medical institution highly desirable. Applicants may choose day or midnight shift. Send resume with salary history to Employment Manager.

Prince George's
General Hospital
& Medical Center
Cheverly, MD 20785
EOE

Full time faculty position in Computer Science

available beginning in January, 1978. Faculty rank; salary: DOE/QUALS. Duties include undergraduate instruction in systems programming, computer architecture and business systems analysis as well as curriculum development. Minimum educational requirement is a Master's degree in Computer Science or equivalent. Industrial experience preferred. Please send resume (including references) by November 15, 1977 to: Robert S. Shaak, Chairperson, Department of Mathematics and Computer Science, Millersville State College, Millersville, Pennsylvania 17551. Millersville State College is an EO/AAE.

POSITIONS AVAILABLE NATIONWIDE

CALL TOLL FREE 800-426-0342

The Following Opportunities are Available in the Insurance Field

Staff Operations Analyst 20K
experience in OS, Systems Programming or Industrial Engineering

Sr. Prog. Analyst 18K
Minimum 2 years OS, JCL and Systems Design

Asst. Dir. of Group Sys 18K
Group Ins. knowledge with OS exp. to assist in design of Group Systems

Group Systems Specialist 15K
Knowledge of APL and strong in Math

PARKER PAGE ASSOCIATES

P.O. Box 12308
Seattle, WA 98111
Offices: Seattle, Wash., D.C., Michigan, Atlanta

COMPUTER PROGRAMMING INSTRUCTOR FOR VOCATIONAL-TECHNICAL SCHOOL

Must have teaching knowledge in COBOL, RPG II, and DOS/VS Assembler languages. Instruction is designed to teach entry-level skills for business application computer programmers and operators. IBM 370/125 DOS/VS computer system available for training. Nine-month program with possible additional employment available during the summer. B.S. degree in Business Education is desirable. Salary commensurate with experience.

Contact:
Personnel Department
Unified School District 501
Topeka Public Schools
415 West Eighth
Topeka, Kansas 66603
(233-0313 Ext. 176
An Equal Opportunity Employer

SOFTWARE DESIGNERS AND SYSTEMS ENGINEERS FOR TRANSACTION PROCESSING

Transaction Technology, Inc. (TTI), a subsidiary of Citicorp, is dedicated to the design and development of electronic banking products, and specifically, Electronic Funds Transfer Systems. Our continued advancement and achievement is due to a strong recognition of the need for high technology, and the commitment to a staff of talented individuals who make it all happen.

We are currently seeking qualified individuals with extensive background in on-line real time systems, experience with large data bases and knowledge of communication networks for the following areas:

SYSTEMS ENGINEERING: Minimum of 3 years experience in the hardware/software development of interactive systems, data base management and/or associated communications systems. Responsibilities will include planning, architecture and design of a new transaction processing network. Seeking individuals with experience in:

- Operating systems for time sharing and real time processing.
- Distributed data base processing and integrated data bases.
- Applications processing.
- Communication subsystems for switching, concentration, network and terminal control.
- Dial-up, private and public data network offerings.
- Intelligent terminals.

DIAGNOSTIC SOFTWARE: Hands-on hardware experience in minicomputers and ability to read logic diagrams. Background in large rotating memories and microprocessors is a plus.

COMMUNICATIONS SOFTWARE: Sound background in interactive network information systems, communications protocols and message switching. A working knowledge of dial-up private and public data networks is required.

SYSTEMS SOFTWARE: Minimum of 3 years experience in one of the following areas:

- Operating Systems: Background with interactive real time, large data base systems; task scheduling; reentrant code and error diagnostics.
- Data Base Management: Working knowledge of sophisticated access routines and file recovery techniques for large data bases.
- System Performance: Experience in system performance analysis and reliability.

MICROPROCESSOR SOFTWARE: Experience in the design of microprocessing firmware applications or diagnostics using the Intel 8080 for network terminals.

SYSTEMS ANALYSTS/APPLICATIONS SOFTWARE: Ability to design and develop software for banking and retail service applications. Background in financial/banking credit authorization systems a definite plus.

QUALITY ASSURANCE: Knowledge of data center operations and experience with system testing, integration and verification. Applicants should also have background in software maintenance and support.

TTI offers an exceptional salary and benefits program which includes a comprehensive group insurance program, pension plan and education assistance to name just a few. We are surrounded by beautiful suburban communities, just minutes from beaches, mountains, deserts, various cultural centers and, of course, Disneyland.

With TTI, you can have the best of both worlds . . . the rewards of a stimulating work environment coupled with the joys of Southern California living! If you thrive on challenge, are committed to quality, and want to work in an environment where your ideas are respected, let's discuss your future and ours. Send your resume, including salary history, in complete confidence to.

LORRAINE WATSON, PERSONNEL MANAGER
TRANSACTION TECHNOLOGY, INC.
10880 WILSHIRE BLVD.
LOS ANGELES, CA. 90024

A Subsidiary of CITICORP

TTI

An Equal Opportunity Employer M/F

EDP CONTROLS ANALYST

NYC LOCATION

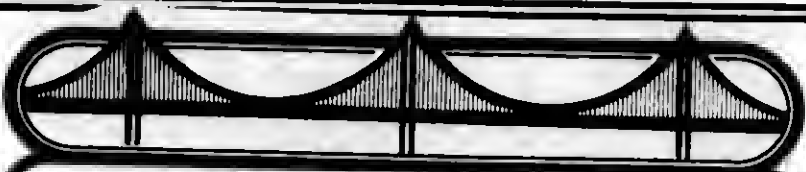
We seek an individual with a primary background in systems development to join our EDP controls staff. Selected candidates will be well versed in all phases of systems development projects and have good oral and written communication skills.

Functional responsibilities include: review of EDP controls, systems integrity, documentation standards, etc. during the design and implementation phases.

Any exposure to EDP auditing and/or programming are definite pluses.

Salary commensurate with experience as well as comprehensive benefits plan.

Kindly send resume and salary history to:
MANAGER OF TECHNICAL RECRUITING
CW Box S132, 797 Washington St., Newton, MA 02160
An Equal Opportunity Employer m/f



EDP PROFESSIONALS

San Francisco/Bay Area

If you are a: PROGRAMMER, SYSTEMS ANALYST, SYSTEMS PROGRAMMER or EDP MANAGER with a minimum of 2 years experience with commercial, financial, manufacturing, scientific systems; we would like to talk with you about career opportunities available in the San Francisco Bay Area.

PERSONAL LOCAL INTERVIEWS

will be conducted the week of Aug. 14th-19th in Boston. For an appointment or more information, please call Mr. Bernie Bernstein, at (617) 426-2000, Sunday thru Friday.

or write:

LOGICAL OPTIONS INC.
233 SANSOME ST. SUITE 1300
SAN FRANCISCO, CA. 94104
415/781-0844

SYSTEMS PROGRAMMER
To $21,788

We are seeking a "Self Starter", who has the ability to present technical ideas in a form suitable for Management Decision Making. This is a position which offers a high potential for professional growth and management recognition.

MINIMUM QUALIFICATIONS:

- Two years systems programming experience on IBM equipment (OS preferred), performing sysgens, applying fixes, maintenance and solving application programming problems.
- High degree of proficiency in BAL.

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Requires BA or BS degree with 2-4 years' experience in systems analysis and programming for business and data base applications

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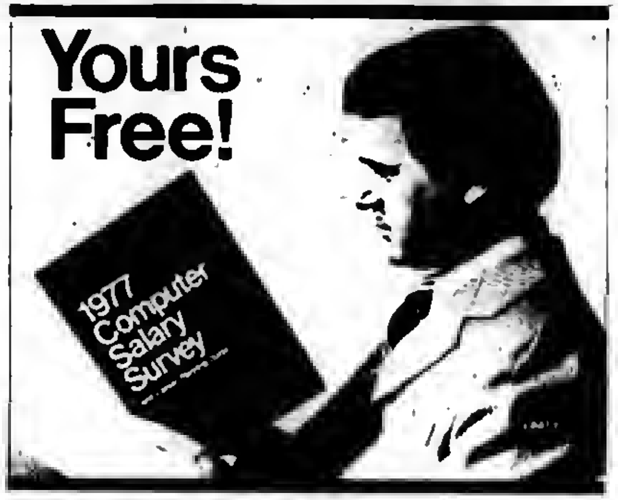

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senior programmer

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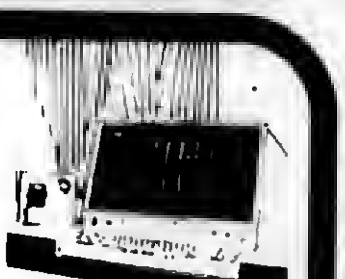

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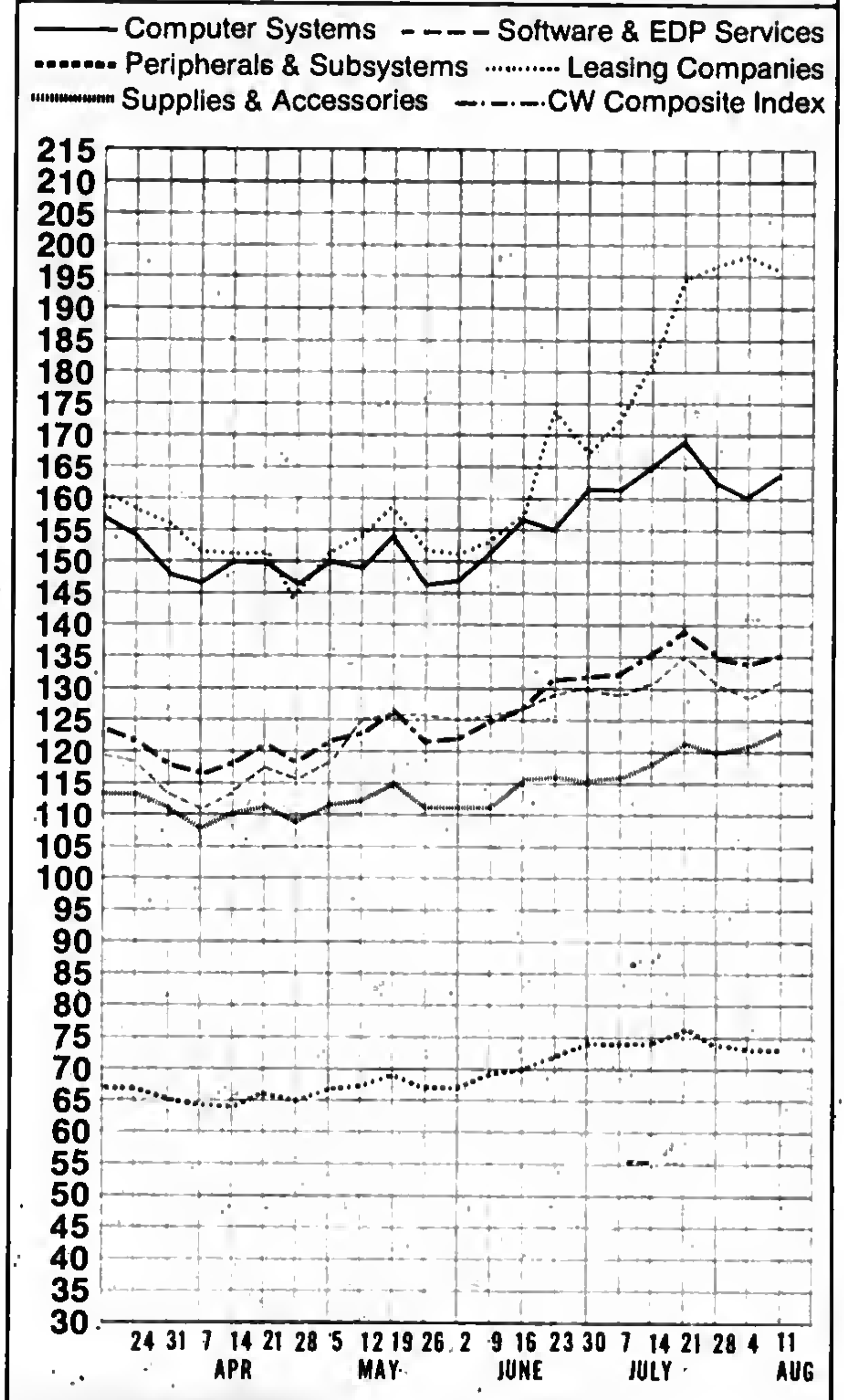

Earnings Reports

MCI COMMUNICATIONS

Year Ended March 51

	1877	1078
Shr Loss	$.02	$1.63
Revenue	62,758,000	28,430,000
Earnings	545,000	(27,204,000)
5 Mo Shr	.02	(.59)
Revenue	17,270,000	10,057,000
Earnings	815,000	(7,708,000)

MEGADATA

Six Months Ended April 50

	1877	1878
Shr Ernd	$.07	$.15
Revenue	5,388,824	2,818,067
Earnings	88,579	115,248

MICROFORM DATA SYSTEMS

Three Months Ended April 28

	1877	1876
Shr Ernd	$.08	$.08
Revenue	8,145,800	4,811,800
Tax Cred	189,100	245,200
Earnings	564,800	459,500
9 Mo Shr	.08	.26
Revenue	15,757,000	14,854,000
Tax Cred	250,800	700,400
Earnings	510,000	1,411,800

MINI-COMPUTER SYSTEMS

Three Months Ended April 50

	1877	1078
Shr Ernd	$.28	$.51
Revenue	2,852,000	2,009,000
Earnings	254,000	212,000
8 Mo Shr	.55	.51
Revenue	5,245,000	5,553,000
Earnings	480,000	557,000

NATIONAL DATA COMMUNICATIONS

Three Months Ended April 50

	1077	1876
Revenue	$885,407	$819,551
Loss	174,257	58,710
6 Mo Revenue	1,537,707	1,101,245
Loss	128,884	228,884

PLESSEY

Year Ended March 51

	1877	1978
Shr Ernd	$.81	$1.72
Revenue	978,000,000	842,700,000
Earnings	18,900,000	34,000,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 10, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

CCMRUTER SYSTENS

EXCH		1977 RANGE (1)	CLOSE AUG 10 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMOAHL CORP	0- 39	54	+3 1/2	+11.4
N	BURROUGHS CORP	55- 91	71 7/8	+5 1/8	+7.6
O	CCMPUTER AUTOMATION	18- 28	27 3/4	+1 1/2	+5.7
N	CCNTROL OATA CORR	20- 26	21	+ 5/8	+1.8
N	CATA GENERAL CORP	55- 50	48 5/8	+2	+4.3
N	OATAPOINT CORP	18- 50	27	+ 3/4	+2.8
N	DIGITAL EOUIPMENT	57- 53	48 1/4	+ 7/8	+1.8
N	ELECTRONIC ASSOC.	2- 3	1 7/8	- 1/8	-6.2
A	ELECTRONIC ENGINEER.	8- 10	8 1/2	- 1/8	-1.4
O	FOUR-PHASE SYSTENS	13- 17	14 7/8	+1	+7.2
N	FCX8CRO	42- 54	47 5/8	- 1/4	-0.5
O	GENERAL AUTOMATION	6- 9	6 3/4	0	0.0
O	GRI COMRUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	82 1/2	+3 5/4	+4.7
N	NONEYWELL INC	44- 55	51 5/8	+ 1/8	+0.2
N	I8M	245-286	268 1/4	-1 1/2	-0.5
O	MANAGENENT ASSIST	5- 9	6 7/8	+ 5/8	+5.7
O	MEMCREX	23- 29	26 1/2	+1	+3.9
O	MICROOATA CORP	7- 18	10 3/8	+ 5/8	+3.7
*O	MOOULAR COMPUTER SYS	5- 8	7	- 1/8	-1.7
N	NCR	52- 46	45 1/4	+1 1/4	+2.8
O	PRINE COMRUTER INC	12- 18	17 3/4	+1 1/2	+9.2
N	RERKIN-ELNER	17- 22	20	+ 1/2	+2.5
N	RAYTHEON CO	16- 53	29 5/4	- 1/8	-0.4
N	SRERRY RANO	54- 42	55 3/4	+ 1/2	+1.4
O	SYCOR INC	8- 15	9 3/4	- 3/8	-3.7
A	SYSTEMS ENG. LABS	5- 8	7 1/4	+ 1/4	+5.5
N	VARIAN ASSOCIATES	15- 21	17 1/4	- 1/2	-2.8
A	WANG LABS.	10- 21	11 3/4	+ 1/4	+2.1

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE AUG 10 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	10	- 1/8	-1.2
O	CCMOISCC INC	10- 13	11	0	0.0
A	CONNERCE GROUP CORP	2- 2	1 7/8	+ 1/8	+7.1
A	CONPUTER INVSTRS GRP	1- 2	7/8	-	-6.7
M	DATRONIC RENTAL	1- 2	1 1/8	0	0.0
A	OCL INC	1- 2	1 7/8	0	0.0
N	ORF INC	6- 9	7 7/8	- 1/8	-1.5
N	ITEL	13- 20	19 1/8	+1 1/8	+6.2
N	LEASCC CORP	19- 27	24 5/4	- 3/8	-1.4
O	LEASRAC CORP	1- 2	1	- 1/4	-20.0
O	NRG INC	0- 1	1/4	0	0.0
A	PIONEER TEX CORR	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 15	14 5/4	- 1/8	-0.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASN
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER.
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SOFTWARE & ECP SERVICES

EXCH		1977 RANGE (1)	CLOSE AUG 10 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECH	1- 2	1	+ 1/8	+14.2
O	ANACOMP INC	7- 10	8 1/2	- 3/4	-8.1
A	ARRLIEO OATA RES.	5- 10	8 1/2	- 1/8	-1.4
N	AUTOMATIC OATA RROC	23- 30	28 1/2	+1 1/8	+4.1
O	COLENAN AMERICAN COS	2- 2	2	0	0.0
O	CONFU-SERV NETWORK	10- 15	10	0	0.0
O	CCNP ELECTION SYSTNS	6- 10	9 5/8	0	0.0
O	CCNPUTER MORIZONS	1- 1	1 1/4	0	0.0
O	CONRUTER NETWORK	6- 8	8 5/8	+1 5/8	+19.6
N	COMRUTER SCIENCES	7- 9	8 7/8	+ 7/8	+10.9
O	CCMRUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	1- 5	1 1/2	0	0.0
O	CCMSHARE	5- 7	6	0	0.0
O	OATA OIMENSIONS INC	5- 5	3 1/8	0	0.0
O	OATATAB	1- 2	1 3/4	- 1/8	-6.6
N	ELECTRONIC OATA SYS.	16- 20	17 7/8	+ 1/8	+0.7
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	+ 1/8	+8.3
O	KEANE ASSOCIATES	3- 4	5 5/4	- 5/8	-14.2
O	KEYOATA CORR	2- 5	1 5/8	- 1/8	-7.1
A	LCGICON	7- 17	12 1/4	- 3/8	-2.9
A	MANAGEMENT DATA	1- 2	1 5/4	+ 1/8	+7.6
A	NATIONAL CSS INC	19- 25	22 1/4	0	0.0
O	NATIONAL OATA CORP	4- 7	5 5/4	+ 1/8	+2.2
A	ON LINE SYSTENS INC	17- 22	18 1/8	+ 7/8	+5.0
N	RLANNING RESEARCH	3- 6	5 1/8	0	0.0
O	PRCGRAMNING & SYS	1- 1	1/2	0	0.0
O	RAPIOATA INC	2- 3	2 7/8	+ 5/8	+27.7
O	REYNCLOS & REYNOLO	17- 20	18 1/4	+ 1/4	+1.3
O	SCIENTIFIC COMPUTERS	1- 3	2 7/8	- 1/8	-4.1
O	TYMSHARE INC	14- 23	21 3/8	+ 7/8	+4.2
A	URS SYSTEMS	4- 5	4 3/8	+ 1/8	+2.9
N	WYLY CORR	1- 2	1 1/4	- 1/8	-9.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE AUG 10 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	AOORESSCGRAPH-MULT	10- 15	15 5/8	+ 7/8	+7.0
O	ACVANCEO MEMORY SYS	7- 9	7 3/8	- 1/8	-1.6
N	APPEX CORR	8- 11	10 1/8	+ 5/8	+6.5
O	ANOERSON JACOBSON	3- 5	4	- 1/8	-3.0
N	APRLIEC CIG DATA SYS	10- 16	15 5/8	- 1/2	-3.5
O	BEEHIVE INT'L	8- 12	8 5/4	0	0.0
A	BOLT,BERANEK & NEW	7- 8	8	0	0.0
N	BUNKER-RAMC	8- 12	11 5/4	+ 1/8	+1.0
A	CALCCMP	3- 5	2 7/8	+ 1/8	+4.5
O	CAMBRIOGE MENORIES	1- 3	2 1/4	-	-2.6
N	CENTRONICS CATA COMP	22- 29	28 3/4	+2 5/8	+10.0
C	CCGNITRCNICS	1- 1	1/2	0	0.0
C	CCMFLTER CCMMUN.	5- 6	6	0	0.0
C	COMRUTER CONSOLES	4- 7	4 5/8	- 3/8	-7.8
A	CCMFLTER EOUIRMENT	2- 3	2 3/4	- 1/8	-4.3
O	CGMFUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
G	CCMTEN	9- 13	10 1/2	- 1/8	-1.1
N	CCNRAC CORP	19- 28	21 7/8	+ 1/4	+1.1
O	OATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 1/4	- 1/8	-1.6
A	DATA PRCDLCTS CORP	9- 15	14 1/4	+ 1/4	+1.7
C	OATA TECHNOLUGY	3- 4	4	0	0.0
C	OATLM INC	1- 2	1 5/8	- 1/8	-7.1
O	OECISION CATA COMFUT	2- 3	2	- 1/4	-11.1
O	OELTA OATA SYSTENS	1- 1	5/8	0	0.0
N	ELECTRONIC M & M	4- 5	3 5/8	0	0.0
C	FABRI-TEK	1- 2	1	+	+6.2
O	GENERAL CCNRUTER SYS	0- 2	1 1/8	0	0.0
N	HAZELTINE CORP	9- 12	8 7/8	- 1/4	-2.7
N	HARRIS CORP	28- 39	55 3/8	+2	+5.9
A	INCCTERM CORR	10- 15	10 3/8	- 1/8	-1.1
O	INFCREX INC	4- 7	4 1/2	0	0.0
O	INFORMATION INTL INC	9- 14	10	+ 1/4	+2.5
C	INTEL CCRR	58- 57	49 1/2	+1	+2.0
A	LUNOY ELECTRONICS	5- 6	4 1/4	- 5/8	-12.8
O	MSI OATA CORP	6- 10	10 1/8	+ 1/2	+5.1
N	MOHAWK CATA SCI	5- 8	6	+ 1/4	+4.3
O	PENRIL CORR	2- 5	4	0	0.0
A	RERTEC CORP	7- 9	7 1/2	0	0.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISICN INST.	2- 2	1 1/2	0	0.0
C	OLANTOR CORP	4- 5	4	0	0.0
O	RECCGNITION EOUIP	6- 10	8 3/8	- 1/8	-1.4
O	SCAN OATA	1- 2	1 1/2	0	0.0
O	STORAGE TECHNOLOGY	10- 15	14 5/4	+1 3/8	+10.2
G	T BAR INC	7- 12	12 5/8	+ 7/8	+7.6
O	TALLY CCRR.	4- 6	3 3/4	+ 1/4	+7.1
A	TEC INC	7- 10	7 3/4	0	0.0
N	TEKTRCNIK INC	29- 37	56 1/8	+2 1/4	+6.6
N	TELEX	2- 3	2 3/4	0	0.0
C	WILTEK INC	1- 1	7/8	+ 1/8	+16.6

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE AUG 10 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 7/8	0	0.0
A	BARRY WRIGHT	10- 14	15 5/4	+ 1/4	+1.8
O	CYBERMATICS INC	1- 1	1	+ 1/8	+14.2
O	DURLEX PRCOUCTS INC	14- 19	17 1/8	- 1/2	-2.8
N	ENNIS BLS. FORMS	6- 7	6 1/8	0	0.0
O	GRAHAN NAGNETICS	11- 16	16 3/8	+ 1/8	+0.7
O	GRAFHIC CCNTROLS	15- 18	16	- 1/2	-5.0
N	5M COMPANY	48- 56	49 3/4	- 3/8	-0.7
O	MCORE CCRR LTD	26- 37	27	+ 5/4	+2.8
N	NASHUA CORR	16- 25	24	+1 3/4	+7.8
O	STANOARC REGISTER	18- 25	21 1/2	- 1/4	-1.1
O	TAB PROOUCTS CO	13- 19	17 1/4	0	0.0
N	UARCO	19- 22	20 1/2	- 1/4	-1.2
A	WABASN NAGNETICS	10- 15	12 1/2	- 1/8	-0.9
N	WALLACE BLS FORMS	17- 21	18 5/4	- 1/2	-2.5

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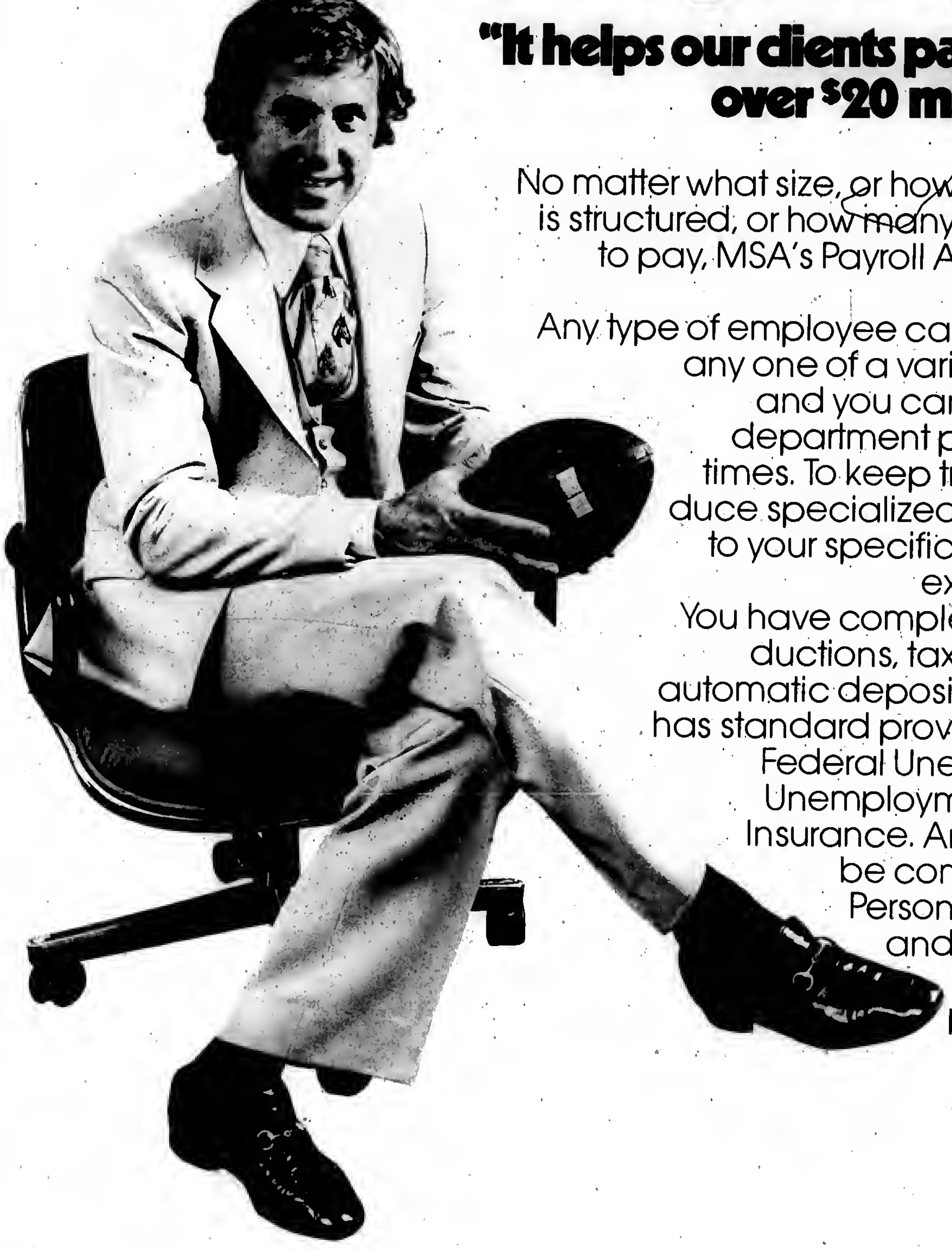

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER

DP Deprives Workers Of Job Satisfaction, Europe Studies Show

By Nancy French
CW Staff

TORONTO — From banks to machine shops to steel mills, workers whose jobs have been changed by computerization have been deprived of at least some job satisfaction, panel members agreed here earlier this month.

Moreover, most of computerization's social consequences are "totally accidental and when "positive" changes do occur, it's a result of "sheer luck, according to Niels Bjorn-Andersen, an associate professor at the Copenhagen School of Economics and Social Science.

These findings were presented at the International Federation for Information Processing (Ifip) Congress 77 here recently during a session on the impact of computerization on work content and job satisfaction.

Peter Docherty, a professor of business administration at the Stockholm School of Economics, described a banking system developed on a management premise that 80% of its workers were "disinterested" in their work. The system, management theorized, should be as simple as possible, placing a minimum of job demands on the tellers who would be using it.

The results were surprising, he said, and were compiled through the bank's suggestion program.

Before the teller operation was computerized, tellers suggested changes that would improve customer services. They were, by attitude, "minibankers."

After computerization, their suggestions concerned added codes, new forms or new displays. Within a year, basic attitudes within the bank had been changed. Minibankers had been turned into keypunch operators, he explained.

Managers who noted the change are now asking themselves who is worrying about customers besides a few bank executives, Docherty said.

Bjorn-Andersen, who studied eight banks in Sweden, England, France and

(Continued on Page 4)

No Argument: 'DP Causes Unemployment'

By E. Drake Lundell Jr.
CW Staff

TORONTO — Computers cause unemployment.

That's about all a recent panel could agree on at the International Federation for Information Processing (Ifip) Congress 77 here.

One panelist argued that while DP causes local unemployment, it actually creates more jobs in other areas. Another contended strong unions could reduce this effect. A third pointed to a need for a dramatic change in social organization to overcome the problem.

Dr. Bruce Gilchrist, director of computing activities at Columbia University, took the first position by indicating that while computers cause unemployment in certain geographic areas, in a global sense they help create jobs.

For example, he said, the AT&T workforce has dropped 7.5% in the past five years — a loss of 75,000 jobs, many directly attributable to automation. In the same time, AT&T's revenues have risen by $6 billion.

That increased revenue is being spent on goods and services by AT&T itself or by people who get the profits from the company, therefore creating more jobs in other areas than were lost at AT&T, he contended.

Because of this, Gilchrist is optimistic that on the global level computers will increase employment, even though he is pessimistic about the effects on individual workers who lose jobs through automation.

For example, he said, while there is high unemployment in the ghetto areas of New York, just 50 miles away there are job openings in high technology areas.

The problem is that "we have al-

(Continued on Page 6)

Technician Paul Schoen makes simulated in-flight adjustment during avionics system checkout in space shuttle orbiter craft at Rockwell International's Space Division in Downey, Calif.

Mini Sizes Up Electronics During Flight of Enterprise

By Jeffry Beeler
CW Staff

DOWNEY, Calif. — While an unpowered prototype of this country's space shuttle was successfully completing its first solo test flight recently, a minicomputer system was evaluating the crucial electronics that will guide and control the craft — and others like it — during the 1980s.

Scientists and engineers at Rockwell International's Space Division here used the system to test both the vehicle's on-board avionics and the general-purpose computer that will someday oversee that hardware.

The test system is one of many computerized tools being used in the National Aeronautics and Space Administration's (Nasa) effort to develop a fully operational version of the space shuttle by early 1979. The latest step in that effort occurred at nearby Edwards Air Force Base on Aug. 12, when the shuttlecraft Enterprise was jettisoned from its Boeing 747 mother ship and glided to a perfect landing five minutes later on a dry lake bed in southern California's Mojave Desert.

Developing and integrating the shuttle's flight control computer with the avionics represents one of the most complex undertakings we've managed," according to Paul Liles, director of Rockwell's Avionics Development Laboratory, where the test system operates.

Liles credited the system with cutting the lab's test-data lead time to about two days. Before they acquired their current configuration, the lab's engineers often had to wait as long as four days while the results of their electronics tests were processed at

(Continued on Page 4)

Federal Planning Unit Urged For U.S. Information Policy

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's executive branch reorganization should include the creation of a body to plan and coordinate a national "information policy," according to a report released here recently by the Department of Commerce's Office of Telecommunications (OT).

Why? Because 46% of the U.S. gross national product (GNP) is derived from producing, processing and distributing information, according to the study, which claimed to measure information's place in the national economy for the first time.

Entitled "The Information Economy," the nine-volume report also pointed out that nearly half of the American labor force is engaged in information "activity."

Furthermore, these workers — in industries as varied as education, research and development, management consulting, common carriage, computer manufacturing and newspaper production — take home 53% of the nation's total wages, author Dr. Marc Uri Porat said.

New applications of telecommunica-

(Continued on Page 6)

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Sparked by Sharansky Case

Ifip Groups Take Stand for Rights

By E. Drake Lundell Jr.
CW Staff

TORONTO – The issue of human rights for Russian citizens arose during the recent International Federation for Information Processing (Ifip) Congress 77 here as more than 100 computer scientists signed a petition supporting the release of Anatole Sharansky, a computer scientist currently in Soviet prison.

In addition, the Association for Computing Machinery's (ACM) executive committee, which held a meeting in conjunction with the Ifip show, adopted a resolution refusing to participate in Soviet-sponsored conferences because of that country's "restraints on computer people."

The 15 participants in the Second International Chess Tournament also signed a letter to the Russians calling for the release of Sharansky.

Sharansky, the immediate cause of the furor over the rights of Soviet citizens, is a 29-year-old computer scientist charged with being an agent of the U.S. Central Intelligence Agency. He has been held in Soviet prison for the past five months.

Sharansky had attempted to emigrate from the Soviet Union to Israel. Because of this he was fired from his job and refused new employment.

He became active in Soviet dissident circles and contacted Western scientists and newsmen interested in the plight of Soviet citizens, according to a spokesman for his wife, who is now in Toronto.

Because of his activities in support of the right to emigrate, which are guaranteed by the Helsinki Convention signed about two years ago by the U.S. and the USSR, Sharansky was jailed originally for "parasitism and hooliganism," the spokesman said, and later charged with being a CIA agent.

In the past five months, no one has been allowed to see or speak with Sharansky, he added, so there is no real assurance he is even alive.

Sharansky a 'Symbol'

The ACM resolution, revealed at a well-attended, ad hoc evening session of the Congress, did not mention Sharansky by name, but referred instead to the general "Russian restraints on computer people."

It said ACM will "not cooperate with any meeting in the USSR" and that the association will "question" participation in any meeting with Russian support.

Dr. Herbert R.J. Grosch, ACM president, said Sharansky is "a symbol of a larger battle." ACM is concerned with intellectual and scientific freedom everywhere, he said, because abridgements to such freedoms "threaten human freedom everywhere."

Dr. Jack Beltzer, a computer scientist at the University of Pittsburgh, told the ad hoc meeting that "science can only exist where freedom of ideas can proceed.

"None of us are free until he is free," Beltzer said, referring to Sharansky.

Pressure Urged

Other panelists called on the assembled Ifip delegates to exert pressure in their own countries to deny Western Computer technology to the Soviets until they give the basic human rights called for by the Helsinki declarations to their citizens.

And Prof. Kelly Gotlieb told the group it should threaten to withdraw contracts with Soviet scientists in such meetings as Ifip unless the Russians change their policies on such human rights issues.

In response to that plea, the ad hoc group adopted a resolution expressing "our dismay of the treatment accorded to Anatole Sharansky."

Release Asked

In the remaining action, 15 members of the delegations participating in the Second World Chess Championships sent a letter to the Soviets urging them to release Sharansky, whose master's thesis dealt with programming computers for chess matches.

The group said his release "would help ensure" that contacts between Soviet computer people interested in computer chess and others of a like bent around the world could continue.

Info Sets Miniconferences

NEW YORK – The latest technological innovations in information systems and predictions for information systems in the 1980s will be the subjects of a four-day "conference-within-a-conference" at the Information Management Exposition and Conference.

About 250 speakers will address 70 sessions in 13 such miniconferences during Info 77, which will be held Oct. 17-20 at the New York Coliseum.

Other miniconferences scheduled include a half-day session entitled "Data Communications Planning for the 1980s," chaired by Dr. David Freeman, senior associate at Ketron, Inc.; and a seminar – involving Honeywell vice-president C.A. Conover and Citibank vice-president Jon Gould – on the pros and cons of replacing mainframes with groups of minis.

The full program and a guide to the exposition are available from Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

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Employees Fake $500,000 in Medicaid Claims

By Ann Dooley
CW Staff

TWINSBURG, Ohio — Tired of bureaucratic hassles with the Ohio welfare department, two employees of Revco D.S., Inc. here tried to take the easy way out by instituting a false prescription billing system. False claims amounted to more than $521,000, according to the drugstore chain.

The two were "frustrated by a substantial backlog of billings that had been rejected by the state over a period of time," a company spokesman said. In order to expedite the process, Myron Winkelman, vice-president of professional services, and John Turk, prepaid prescription program managers, instructed their clerical employees "to doctor" Medicaid claims at two stages of the billing process, according to George C. Smith, prosecuting attorney.

Fabricated New Claims

Employees were told to make up new bills to replace those rejected by the state or fix claims rejected by Revco's own computer before the welfare office had seen them, Smith said.

Revco's computer, which handles the billing operations, is programmed to reject improper claims before they go to the welfare office in order to alleviate the number of inaccuracies encountered by that agency.

Claims are returned for reasons such as recipient ineligibility, duplication or incorrect or incomplete information, Smith explained.

Rather than resubmitting returned claims, the two employees decided to "fabricate new claims. It was easier for them to hook a false claim onto a legitimate one than to analyze what might be wrong with a rejected claim," a spokesman at the prosecutor's office said.

The clerical workers were told to use "model claims" — prescriptions that had already been accepted by the state and paid, Smith said.

Plead No Contest

The two men pleaded no contest in Franklin County common pleas court to misdemeanor counts of falsifying prescription billings.

Judge Jay C. Flowers fined Revco $50,000, the maximum fine for a first-degree misdemeanor, and ordered the company to pay the state the full $521,000 in restitution. Winkelman and Turk were each fined $2,000.

The scheme was discovered after an Ohio welfare worker making a routine audit of prescriptions noticed pairs of prescriptions were being billed to the account of the same welfare recipient two or three days apart. The prescription numbers of the bills were nearly identical, according to Smith.

Revco said "virtually all" of the improper billings covered "actual transactions that had previously taken place in Revco stores and that involved dispensing prescriptions to welfare recipients." Some of the bills will be corrected and resubmitted to the welfare department for payment.

Investigators found 208,539 improper or disputed claims from all 159 Ohio Revco stores.

The two men acted "without the knowledge of other corporate officials," according to Smith. The company had no comment on what, if any, action it might take against Winkelman and Turk.

After the court action, the Ohio Welfare Department lifted the suspension set on Revco during the investigation.

The billings have reached more than $700,000 and payment of the backlog will begin "subject to normal start-up measures," Revco said.

Since the scheme was discovered, both Revco and the welfare department have established new controls on paper work and computer workflow to avoid a similar incident, a spokesman said.

Mass. Rebids Second Contract

BOSTON — For the second time in several weeks, the Commonwealth of Massachusetts has been forced to reopen bidding on a contract that had already been awarded.

The $19.5 million Medicaid contract granted recently to Blue Cross/Blue Shield with a subcontract to Electronic Data Systems Corp. (EDS) was withdrawn after several other bidders filed complaints [CW, Aug. 8].

After hearing the evidence, a review board recommended to Gov. Michael S. Dukakis that all the bids be reevaluated.

The review board action followed hard on Dukakis' decision to halt a $23 million facilities management contract also awarded to EDS, because of an apparent conflict of interest.

In that case, two members of the selection board that awarded that job were also officials of Sci-Tek Associates, a firm involved with EDS in a contract in Tennessee [CW, Aug. 15].

Although Sci-Tek has been barred from further participation in the Massachusetts facilities management plan, EDS said it will bid again.

In the Medicaid case, the review board found two of the five bidders, Citibank and Pilgrim Health, were denied oral argumetns to defend their proposals and clear up any misunderstandings, a spokeswoman said.

A new selection committee is being formed to look at the companies that wish to rebid.

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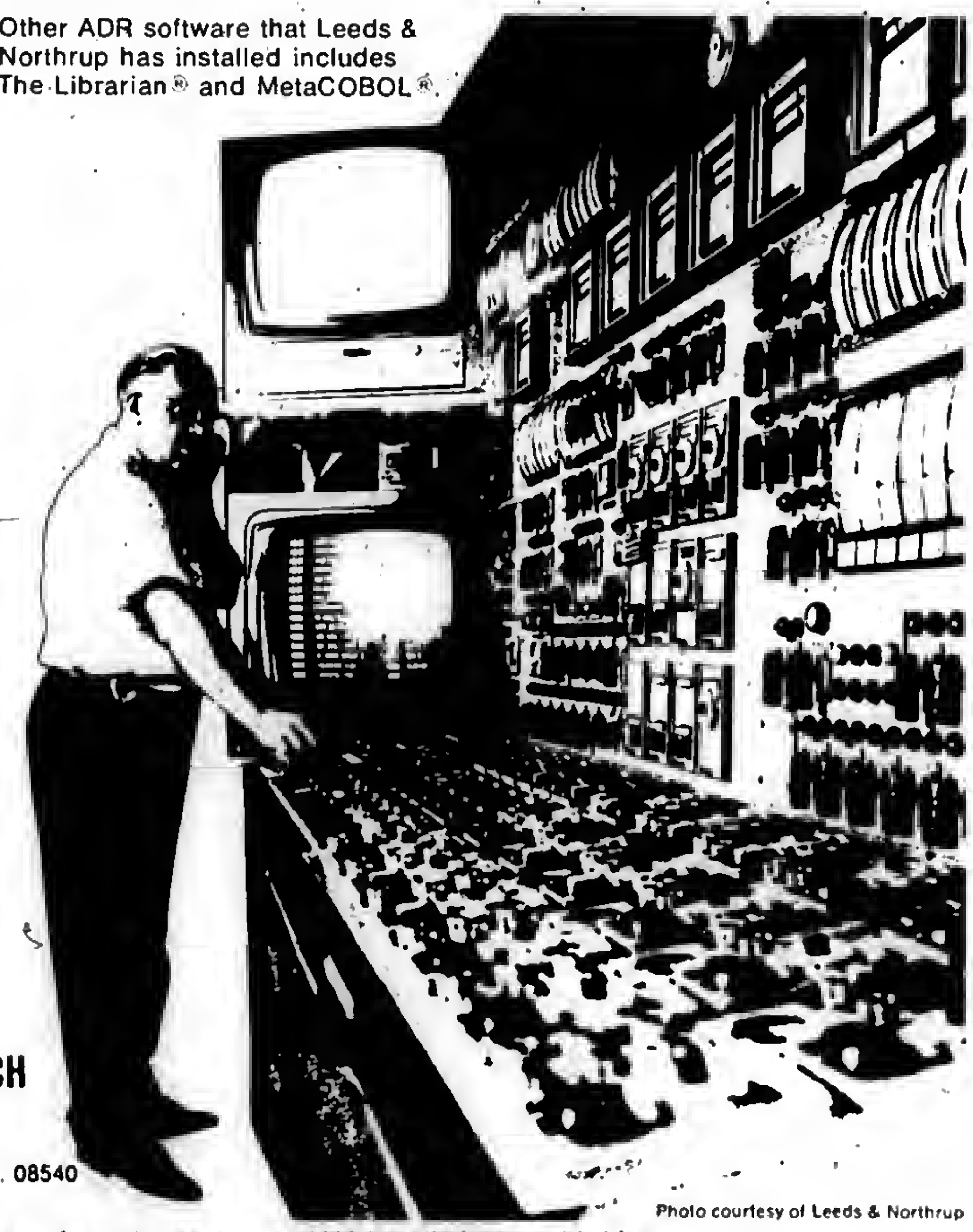

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Scandanavian Laws Give Workers Vote on DP

By Nancy French
CW Staff

TORONTO – The governments of three Scandinavian countries have passed laws to protect workers from changes in their jobs brought about by computerization, according to Niels Bjorn-Andersen, an associate professor at the Copenhagen School of Economics and Social Science.

Bjorn-Andersen, who appeared on a panel convened to discuss the impact of computerization on work content and job satisfaction, said the laws fall under the category of work protection acts. All three require systems designed to take human factors into account in designing new jobs, Bjorn-Andersen told attendees at the session held during the International Federation for Information Processing (Ifip) Congress 77 earlier this month.

Swedish Act Lacks Teeth

The codetermination act passed by the Swedish Parliament establishes as a general principle that every employee whose job is changed by computerization has a right to be consulted. However, no details or regulations back it up.

In Norway, however, the law is supplemented by an agreement between the Trade Union Association and the Employers Association. This agreement provides that companies inform the trade unions ~~and users~~ "at the feasibility-study phase" of systems designs that would lead to computerization of their jobs.

No such principle has been adopted in Denmark.

In Denmark, Norway and Sweden about 90% of clerical workers are unionized, Bjorn-Andersen said, making such laws of significant importance to company management.

In at least two cases, systems were vetoed by union personnel under the laws, he noted. One was a one-way on-line data entry system scheduled for implementation at a manufacturing company. After the workers studied the proposed system, a strike was threatened, he said, and management substituted a system that used interactive terminals for the one-way system originally designed.

In another case, IBM's Class package was installed in a job shop to aid in planning production, he said.

The system turned out to be objectionable to workers for several reasons.

First, it was inflexible. Because of the way it accounted for manufactured items, all overtime was being scheduled on the weekends.

Secondly, it eliminated cross-contact between the workers, which they found unpleasant, according to Bjorn-Andersen, who noted this system was also withdrawn.

Studies Show DP Erodes Job Satisfaction

(Continued from Page 1)

Denmark, explained that results were not necessarily consistent from bank to bank, since each designed its computer system differently. However, in many cases work became more repetitious and routine as tellers were turned into part-time keypunchers, he explained.

In other cases, tellers actually had more time to spend with customers as the routine repetitious jobs were assumed by the computer.

All Jobs More Programmed

However, overall jobs became "more structured, more programmed and more preplanned," Bjorn Andersen said, adding in each of these cases systems designers had "assumed there would be no changes."

Systems designers must be aware of the connection between computers and work satisfaction. In designing systems they must take into account the psychological components of human beings — their motivations and aspirations, according to Otto Zich of Voest Alpine AG, a steel company in Linz, Austria.

Zich illustrated the magnitude of the problem by explaining that 50% of the steel mill's employers are involved in "information processing" today, compared with 15% only 27 years ago. Further, less than 10% of the steel mill's employees actually do any physical work.

It is essential that work involving computers be "humanized," he said.

Dr. Josef Hatrany of the Hungarian Academy of Sciences' Institute for Computer Sciences described one system that does just that.

The system, which was implemented to speed production in a machine tool shop is designed to "make the computer" the machinist's friend, Hatrany said.

The machine room controller and the tool machine are in the workshop while the computer itself is in the computer room. The worker may have a "dialogue" with the system, he said.

He may ask the system what parts need to be machined and decide what parts he wishes to make first, for example.

Tool cutting values also may be modified by the worker whose years of experience tell him that the parameters set by the system are not the best.

The master-slave relationship is "unambiguous"; the human is always the master, Hatrany explained.

The system is designed so the worker can make decisions without modifying the computer's decision tree — and without having a confrontation with the machine, he noted.

Confrontations Human

"In all hierarchies confrontation is inevitable," Hatrany said, but this system is designed so all confrontations are human — between the workman and his human boss.

In discussing the problem with attendees, the panelists urged that systems designers invite sociologists and psychologists to participate on design teams.

New performance measures must be developed that account for non-economic considerations, one panelist suggested.

Another suggestion was "participative design" — or involving users rather than only expert designers in the development process.

By "users" the panel members explained they didn't mean the head of the user department but rather a large number of workers whose jobs it would be "to sit at the terminals."

Mini Sizes Up Enterprise

(Continued from Page 1)

Nasa's Lyndon B. Johnson Space Center in Houston and then returned here for evaluation.

Liles also credited the system with allowing his staff of eight programmers to simultaneously debug and update software for the first time since the laboratory was established in 1973.

Machines Swamped

Before they acquired their current test system, the lab's engineers evaluated their avionic hardware with a battery of five stand-alone Data General Corp. Nova 840 minicomputers. But as the number and complexity of the lab's electronic tests increased, the original configuration soon became swamped by the growing DP workload.

Moreover, the 840s could perform only one DP task at a time, Liles recalled.

To overcome these drawbacks, the lab supplemented its existing test system with seven additional minis — four for data acquisition and reduction, one for program generation and two for controlling simulation programs. One of the computers, a DG Eclipse S200 system, generates all the laboratory's test procedures, which it then forwards to two additional S200s, which run the programs.

An eclipse C300 processor and three Nova 2 computers, meanwhile, collect test data and perform the arithmetic compilations used in determining test status.

Before they installed their latest minicomputers earlier this year, Liles and his colleagues in the laboratory had considered expanding their avionics test system with an IBM 360. Two factors, however, ruled out that alternative, Liles explained.

First, the large-scale system, unlike the DG minis, would not have been compatible with the lab's existing test equipment, and the cost of linking the 360 to the Nova 840s would have been prohibitive.

Second, the nature of the laboratory's hardware tests demands a real-time, dedicated computer system, not a remote batch unit like the IBM 360.

"When you're doing electronics test of this sort, you don't want to wait for your results," Liles said. "You can't afford to go into a queue or a batch mode."

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Witness Affable, Cooperative

Withington Still on Stand, IBM Trial Plods On

By Molly Upton
CW Staff

NEW YORK — As the days of summer grind on, the self-proclaimed "Son of Sam" is captured and the memories of the great blackout of 1977 begin to fade here, the U.S. antitrust suit against IBM continues to plod along, with all participants hoping for an early break in the action.

And, ironically, the man who fought hardest against being a witness for the government has now been on the stand longer than any other participant so far.

Frederic G. Withington, a computer industry expert with Arthur D. Little, Inc., fought a subpoena for his testimony here in the Second District Court for New York up to the U.S. Court of Appeals, where he was turned down. The appeals court refused to quash the subpoena because of the importance of the case and on some technical grounds.

He now holds the record of being on the witness stand the longest — 21 days — and for producing the most pages of testimony — over 3,000 — in this trial which is in its third year with little relief in sight.

Despite New York's muggy heat and length of time he has spent on the stand, Withington has been affable, succint and cooperative — to both sides in the case.

In fact, he is quite "proud" of his record and said everything he knows about the computer industry can be found somewhere in the transcript of his testimony.

Withington's knowledge of the industry is broad enough to make his testimony of interest to both IBM and the Justice Department; while the government kept him on the stand four days for direct examination, IBM cross-examined him for 12. The remaining days have been taken up with redirect and recross-examinations.

In addition to his general knowledge of the industry, Withington brings some personal expertise to the case since he has consulted directly with some of the firms in the business including IBM itself, Honeywell and RCA when it was still active in the field.

Little Time Wasted

But while Withington's testimony has been going on, courtroom participants have been hoping for the two-week recess promised by the judge when Withington leaves the stand.

As a result, there has been a minimum amount of time wasted recently — a condition not found in earlier portions of the case.

Judge David N. Edelstein has been quite abrupt with Ron Rolfe, an attorney for IBM. Edelstein has declined to hear Rolfe's reasons for objections and at least once admonished him severely, telling him to sit down.

Although David Boies — another IBM attorney — will stay on the case through the testimony of the government's main economic witness, Dr. Alan K. McAdams, Boies said he's looking forward to the vacation. After finishing up with this case, he is slated to become chief counsel for the Senate Antitrust and Monopoly Subcommittee, which is looking at various proposals to update the antitrust laws.

Another man planning to leave the case in the near future is the government's lead attorney, Raymond Carlson, who says he's looking forward to retiring and devoting full time to the tennis court.

Carlson will be replaced by Robert Staal, formerly of the Justice Department's San Francisco office, who has been waiting in the wings since July. Staal will lead the Justice team during IBM's defense of the case.

In the past, the government had predicted it would finish its case by Labor Day, but that now appears impossible. First there will be the vacation, then McAdams will resume the stand and will probably be cross-examined for several weeks. The government then plans "a couple" more economic witnesses to wind up its case.

If everything goes perfectly, one person close to the case indicated last week, the government might be finished by mid-October. Late November is probably more likely, however, he said, chuckling when asked if January wouldn't be more like it.

As usual, the contrast between the strength of the teams is overly apparent. Carlson, who fills his own water pitcher, is conducting this portion of the case with one assistant.

The IBM table, meanwhile, is replete with Cravath, Swaine and Moore attorneys Ron Rolfe, George Hritz, David Boies and Morris Waisbrot.

DPer Sought by FBI Found Dead in Motel

KANSAS CITY, Mo. — Henry Joseph Manning III, a systems analyst sought by the FBI for embezzlement and bank fraud [CW, July 25], was located late last month "as a direct result of the photograph and article" about him in *Computerworld*, the FBI announced here last week.

Located in Denver, Manning took his life in a motel room before police were able to apprehend him...

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Planning Body Urged for Information Policy

(Continued from Page 1)

tions and computer technologies — the core of the "information society" the U.S. is about to become — will continue to cut across all other sectors of the economy and their impact is "too important to be left to technologists," Porat maintained.

"Decisions that are made . . .*within* the communication policy and business worlds can affect many external constituencies whose voices and concerns are not always heard by those making decisions about information technology," Porat said.

"When we restrict the scope of policy attention to the pitched battles and fireworks within the telecommunications-cum-computer world, our perspective is too narrow, and society's interest is not properly served," he added.

Coordination Missing

At a time when the successor to the industrial society is upon the U.S., the federal government lacks any information policy coordinating mechanisms, Porat stated. He suggested the creation of an "information policy forum" is "the main recommendation of this study."

Prepared by an OT research team led by Porat, the project was based on 1967 labor, economic and census statistics. It was funded by the National Science Foundation's Division of Advanced Productivity Research and Technology.

The first two volumes of "The Information Economy" contain the study's methodology, major findings and recommendations. In these volumes Porat defines "information" — "Data [that has] been organized and communicated" — and breaks "information activity" — "the resources consumed in producing, processing and distributing information goods and services" — into two sectors, primary and secondary.

The "primary information sector" encompasses firms supplying information goods and services exchanged in the marketplace; the "secondary information sector" includes all information services produced for internal consumption within government and within noninformation firms.

Formal Set of Accounts

The report constructs a formal set of national income and product accounts for these two information sectors. Two input/output matrices provide an overview of the interrelationships among the varied types of information and noninformation activities.

The study further specifies the information-related occupations of the primary and secondary information sectors. Since the mid-1950s, the information sector has employed the highest percentage of the U.S. labor force, Porat determined.

Information policy issues tend to be "horizontal" in their impacts, he said in his study. Porat cited as examples of these impacts "the edgy and uncomfortable feeling in the U.S. Postal Service as electronic mail approaches" and the "polite realignments in the finance industry as electronic funds transfer systems threaten to extinguish certain distinctions between commercial banks and savings and loans."

The federal government, however, makes policy on a "verlical basis — within the communications and computer industries through the Federal Communications Commission, the Office of Telecommunications Policy at the White House through OT and with the "assistance" of private-sector interests, Porat noted.

Those agencies willing to tackle the economic and social conflicts generated by the introduction of new information technology applications generally do so on a parochial basis, often not even referring to the vertical issues within the communications and computer industries themselves, he said.

The "forum" proposed in the study should be an interagency-coordinating body in the executive office of the President, Porat stated.

When the home is transformed by the communications center and the information utility, the information society will have arrived in the U.S. That is only one generation away, according to Porat, who warned that is the length of time left to attack the issues brought about by information technology.

The Solution

The solution is "a coherent national information policy; and the legislative and executive will to confront the issues in a sensible manner," Porat contended.

In addition to recommending that Carter establish the forum within the White House, the study suggested the Commerce Department's Bureau of Economic Analysis review the usefulness of constructing permanent information sector accounts.

No Argument: DP Causes Unemployment

(Continued from Page 1)

lowed these disruptions to be under the control of individual companies," he said, adding companies are much more flexible than workers and can make changes — either through automation or geography — without retraining the displaced workers.

At the same time, however, automation cannot be limited he claimed, because that would limit capital investment, which creates jobs.

"We need to relate the production of jobs with the reduction of jobs." This would take a national program and central planning in order to train workers for the jobs available and to retrain those workers displaced from one job for newer jobs, he explained.

Ulrich Briefs, a West German economist, said the problem of unemployment caused by computerization is not just one of technology, but also of the overall stagnation of the economies of the Western industrialized nations.

Briefs, who is with the Institut des Deutschen Gewerkschaftsbundes GmbH in Dusseldorf, noted that computers are one of the most powerful labor-saving tools and are therefore primarily used as substitutes for labor.

While the effects of computerization on employment are not clear now, he said computers have displaced at least as many jobs as they have created.

The effects are most visible in the clerical and production areas at present, but he warned that with the advent of heuristic programming and automated decision-making systems in the future, computers will begin to replace management-level personnel.

Today, 40% of the white-collar unemployment and 20% of the blue-collar unemployment in Gemany can be directly attributed to computerization, he said, adding that computerization accounts for about 15% of all jobs lost since 1970.

"But this is far from the peak," he said. For example, the wide-scale use of word-processing equipment in West Germany could cost as many as 1.5 million jobs in the future, he predicted, noting total German DP employment accounts for only 250,000 jobs now.

Briefs also noted that while computer stock installations have been increasing in Germany over the past two years, the nation has gone from full employment to an unemployment rate of 4.5% at the present time.

The only way to avoid this is to get the economy growing at a faster rate than computerization so there are enough new jobs for the workers displaced by computers. This means a change in the economic system in many Western countries and more nationalization of industry, he said.

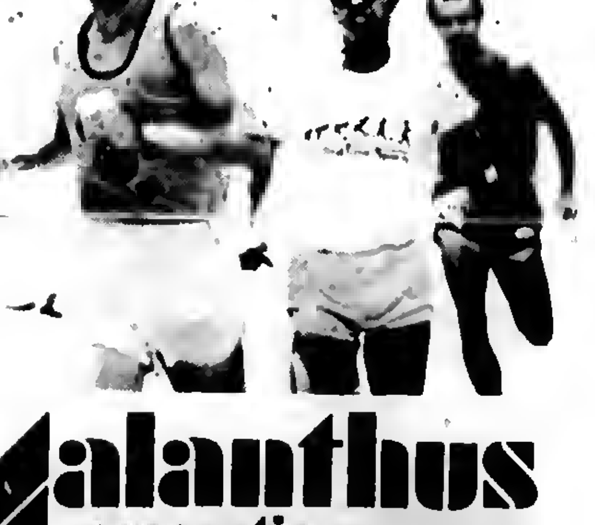
Jean-Claude Parrot, president of the Canadian Union of Postal Workers, said it is clear that employers "see the effect of computers as fewer workers and greater profits.

"Computers," he said, "have not created jobs. Computers are designed, generally speaking, with one purpose in mind — to increase the profits of the corporation which use them — not to improve social welfare, not to increase employment and not to improve the working conditions of workers."

However, unions are becoming aware of computers' impact on jobs, he indicated. "The impact of computerization will be decided, more than anything else, by the strength and militancy of the working class," he added.

Session chairman Olaf Engberg, representing the Danish computer Society at Ifip, said the discussion proved that in many ways the old economic rules are no longer working and new rules and attitudes toward employment need to be developed.

In all, public debate on the issue of computers and employment is necessary, no matter how painful, Engberg concluded.



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Panel of Experts Finds

'Social Accountability of DP' Difficult to Define

TORONTO — Just what is the "social accountability of computing?"

A panel made up of some of the world's experts on the subject grappled with that question at a session of the same title during the recent International Federation for Information Processing (Ifip) Congress 77 here, but it was unable to come to any clear resolution.

"We lack good theories to predict the interplay between computers and society," session organizer Dr. Bob Kling admitted.

But work has started in developing such theories, according to Kling, a faculty research associate with the Public Policy Research Organization of the University of California at Irvine. "I hope it's not too late," he added.

Computing is clearly becoming more widespread, he said, and computer scientists and others should ensure that its effects on society at large are benign.

So far the benefits of computing systems have accrued to those organizations able to apply them; the record of benefits to the public has been "spotty" at best, he said.

In fact, he indicated, the record so far shows there are "small but precise" benefits to the "elite" from computer use and "small problems " for others.

Five Models

There are five suggested models for handling the effects of computers and society, Kling pointed out.

The first is the free market aproach in which price and consumer demand are seen leading only to benign services.

In reality this does not always work out that way, Kling said, since the model assumes that there is a market with many buyers and sellers and that users can move easily from one system to another.

This model also assumes all the benefits and problems with systems are known in advance, which is not always the case, he noted.

The second model is the legislative one where laws are developed to control the unwanted effects of computerization.

The third is a regulatory model where regulatory bodies are established to monitor the effects and make computer systems accountable. The drawback here, he said, is that such bodies often become the subjects of the industry they are supposed to regulate and sometimes act to restrain trade.

Another model is that of professional control over the technology, with professionals setting up the rules for accountability. Unfortunately, Kling indicated, people in the computer business are hired employees who can assert little control over the ways in which the technology is applied.

The final method sometimes discussed for making technology accountable to society is that of citizen action, in which citizens can bring suit or political pressure against abuses in the use of computers.

Prof. Kelly Gotlieb of the University of Toronto said there are many conflicts in the area of social accountability of computing.

Areas that are close to resolution, he said, include that of data confidentiality and the one concerning the rights to intellectual property, such as copyrighted works, used in computer systems.

Those are primarily legal questions, he said, and are being dealt with on a legal basis. Other questions in the area of social accountability will not be as easy to resolve, he indicated.

For example, the conflicts between personal morality, organizational loyalty and professional ethics are a "searing issue" that will not go away, he said.

In addition, the problem of the profession's responsibility for influencing public opinion about issues concerning computer use is not one that will be easily solved, he said.

However, the most pressing issue concerning the interaction of computers and society is that of employment and the effect of computers on either creating or reducing employment opportunities, Gottlieb said.

Klaus Brunnstien, a West German computer scientist, said that to date the activities of the computer field that have affected society have been minor, but warned they will grow.

"Basic knowledge of our own area is crude," Brunnstien said, adding that knowledge of computer application areas and their effects is even less well understood by computer scientists.

The profession must admit to this lack of knowledge, he said.

The computer professional needs to have more of an attitude of responsibility toward the use of his systems, he indicated, calling for more discussion of codes of good conduct and a greater emphasis on social accountability within computer science curricula.

Today there is a generally positive view among the general public toward computer systems, but this could change, he warned, just as nuclear energy was originally greeted positively but has been coming under greater criticism as its effects become better known.

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Hobbyists Seen Setting Communication Trend

By Molly Upton
CW Staff

TORONTO – Man might do well to apply what he has learned about building computer and communications systems to the social structure as a whole, according to Paul Baron, president of Cabledata Associates in Palo Alto, Calif.

The former member of the Institute for the Future envisions a world in which interpersonal international communication is greatly increased – not through any intent of large corporations or governments, but by individuals' use of micro-based packet-switching networks.

In designing a packet-switching network, for instance, one of the key concerns was redundancy "to ensure robustness," he told a session on "Data Networks – Past, Present and Future" at the International Federation of Information Processing (Ifip) Congress 77 here.

This would eliminate dependence on one monolithic structure, such as now exists with the country's governmental decision-making in one location.

The people-to-people-type structure gives society a more stable organization that is more adaptive to change than a monolithic hierarchy, he said.

Pocketbook Prices

Much of the hardware will soon exist at pocketbook prices to facilitate the people-to-people communication Baron envisions, he said.

The five major components of such a person-to-person packet-switched net are the user's terminal, a local distribution system, a packet-switching node, long-distance transmission lines or satellites and a host computer, he said.

The microprocessor makes the hardware needed for a node affordable for a hobbyist. One group is writing software for a distributed network that uses telephone lines, he said, adding he expects low-cost terminals will soon be available.

These can be "bootlegged" by acoustic coupling onto phone lines, whose cost is reasonable if divided among a number of users.

Also, he thinks it is possible using small ground stations to "bootleg" or spread a spectrum on satellites without detection.

"We may be entering a new era in which a small group using its own funds can build the information and network processing systems of tomorrow," he suggested.

"Hobbyists are probably having a more profound effect on technology development than even the amateur radio enthusiasts did back in the early days of radio," Baron said.

Hobbyist software tends to be better written than commercial and the hobbyists trade software and work together well, he observed.

The basic stumbling block to increased interpersonal communication over national boundaries is government controls, he said.

Perhaps it's time to consider whether these controls of communications channels should be open to the individual, he said.

Replace Postal Mail

The availability of messages could replace postal mail at less cost, he indicated. Communication that occurs in hours rather than weeks is of a different type, he added.

Bypassing government controls on international communications might enable man to do more than all the government's efforts to assure stability and peace, he speculated.

Long-term world order will occur when the disparity between the wealth of nations disappears, he indicated.

And communications plays a part in the status quo, since more than half of the gross national products of developed nations are developed via the transmission and processing of information.

Packet networks have tremendous potential and could be more important than voice telephone connections in furthering international communication, Baron said.

For instance, those in the know are quiet about the fact that the major portion of traffic is messages interchanged by humans with a relatively simple intermediate computer processing. They are not, in fact, messages from machine to machine, he indicated.

This fact is not being flaunted in order to avoid "sticky regulatory" problems, he said.

A three-minute telephone call over voice-grade can transmit 7,000 pages of text, but old tariffs block such applications.

"Thus, those who transmit data at these bargain rates do not want to talk about their loophole. In the process, however, we are concealing a major evolutionary development – a breakthrough in low international communications costs for alphanumeric text," Baron said.

Meet to Cover Transnational Data

Special to CW

PARIS – The economic and social effects of data moving across national boundaries will be the subject of a major international symposium Sept. 20-23 in Vienna, Austria.

The Organization for Economic Cooperation and Development (OECD), with 24 member countries including the U.S., expects 250 representatives of government and private industry to hear 40 speakers present views on international computer communications networks.

OECD headquarters in Paris indicated the four-day program entitled "Symposium on Transborder Data Flows and Protection of Privacy," will concentrate on "the transnational dimensions of computer applications in terms of ensuring the security, integrity and privacy of data; the importance of maintaining the principle of free and continuous flow of information; and complex economic, social and legal problems arising from the transfer of such data.

The symposium is to be a forum for speakers from the U.S., Canada, Europe, Japan, Australia and New Zealand. They will represent different interests in transborder data communications, including manufacturing and commercial users of systems for internal management purposes; financial, banking and insurance organizations; and public administration agencies such as tax, police and social insurance authorities.

Also represented will be computer service bureaus operating internationally, data communications carriers and regulatory bodies and information and documentation service networks.

Most Immediate Issue

The most immediate and concrete issue of international interest, according to OECD, is the possible effect of emerging national privacy laws on multinational communications.

"Already some countries have indicated a preference for special restrictions on sensitive data which can be sent abroad [and some] intend to apply embargoes over transshipment of credit and other types of information," the organization reported.

U.S. participation is being organized by the State Department, which indicated 30 to 40 Americans will attend. Among the U.S. speakers will be John Richardson, director of the Office of Telecommunications, Department of Commerce; Phillip Onstad of Control Data Corp., representing the Association of Data Processing Service Organizations (Adapso) international committee; Prof. Alan Westin of Columbia University; Michael Keplinger of the National Commission on New Technological Uses of Copyright Works; and Carole Parsons, executive director of the Privacy Protection Study Commission.

Oswald Ganley, a deputy assistant secretary who is responsible for this U.S. involvement in OECD, recently discussed the issues before a congressional committee.

The issues, according to Ganley, are:

- Protection of the privacy of U.S. citizens whose personal data is transferred to other countries.
- Possible adverse effects on multinational corporations that would be forced to comply with different foreign data protection laws and regulations.
- Fear of nontariff barriers which might hinder or exclude U.S. firms in European markets.
- Retention of a free international flow of information, especially so scientific, commercial communications and cultural information will not be limited.

Avoidance of dislocations in commerce and industry is a prime objective of the OECD.

"Stringent regulations in some countries might lead to the creation of 'data havens;' that is, sanctuaries of data kept in more permissive countries.

"It may also be necessary to avoid unnecessary bureaucratic obstacles to transborder data movements and ensure fair competition practices," an OECD statement concluded.

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For Greater Productivity

DP Managers Urged Not to Resist Change

By Nancy French
CW Staff

TORONTO — As the DP manager strives for continuing productivity improvement, change is the essence of his work. The manager who cannot cope with change, who cannot plan for change, who cannot produce continuing change will not be effective.

This was the basic premise of a presentation by Mayford Roark of the Ford Motor Co. at the International Federation for Information Processing (Ifip) Congress 77 here recently.

Appearing as part of a program entitled "Future Directions in Information Management," Roark illustrated his point by mentioning some of the changes that have occurred during his 12 years at Ford.

For one thing, computing power has increased seven times, he said, while throughput has increased by a factor of 20.

Moreover, the company's industrial control systems, which consisted of about 400 small computers less than a year ago, have since been supplemented by 100 more.

Microprocessors, which have been in use for only three years at Ford, will have a greater impact within a decade on the company than any computer system existing today, he said.

Micros are not replacing old systems. They "have special functions for new and unreachable applications," he said. The old applications continue to grow at about 20% annually.

Explosion in Technology

This explosion in technology is in direct contrast to life only a few centuries ago, when skills once learned lasted generation after generation, or at least a lifetime.

In DP today, Roark said, many people have already "recycled" their working tools several times over.

Roark's approach to the management of change included 12 suggestions.

First, he said, system managers must be oriented to the prospects of change as something desirable — as a basis of improving productivity.

Systems should be viewed like cities — they grow, evolve and change as the needs change, he said.

Roark's second piece of advice was not to attempt too much in one step. "Such projects fail," he said, adding managers should break the long-term plan into a series of achievable projects.

Third, he urged session attendees, recognize that technology is based on group accomplishment. Even if it were practical to build one-man systems in data processing, they would not be particularly desirable since they are more subject to fraud or abuse, he noted.

The system designed by a group "may lack the genius that a single person's project might have, but people can use it and modify it with greater ease."

Flexible Modes of Organization

Fourth, Roark suggested adopting flexible modes of organization. Don't always set up project teams where the manager functions strictly as a supervisor; seek new organizational forms that keep pace with new organizational requirements, he recommended.

Fifth, beware of trying to solve difficult problems by increasing manpower, he warned. Brook's Law states that adding manpower during the late stages of an overdue software project will only delay its completion further because of the new responsibilities and work assignments the team members will be forced to accept.

Development Tools

Sixth, use development tools such as top-down design and structured programming to make systems easier to modify. Training in such programming productivity tools was one of the most useful educational programs Ford ever undertook, he said.

Seventh, think of systems as involving people as well as hardware and information flows. Systems should be created so the people who will use them have an incentive to do their jobs accurately, he said.

Eighth, look for secondary consequences of systems — both positive and negative, Roark urged. For example, a data base may end up having many additional useful functions, or a new management information system may create unforeseen organizational rivalries.

Ninth, seek productivity improvement within the systems function. During the '70s at Ford, the workload increased 20% annually, but the number of employees actually declined. The DP manager should aim at annual productivity increases of 10%, he said.

Learn to use tools of planning, and always be clear about the problem to be solved; concentrate on projects that can bring the most benefits, Roark recommended.

Be Clear

Finally, "be concerned about the manager as a key resource." Don't get swept away in an effort to prove omnipotence. The care and preservation of people involves creating an environment for growth as well as limiting abuse," he said.

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Erosion of Privacy by DP Avoidable: Panelists

By Molly Upton
CW Staff

TORONTO — Is the erosion of privacy an unavoidable consequence of computer applications?

Not necessarily — if timely controls are applied and if DPers address social issues rather than strictly technical ones, panelists from three continents agreed at an International Federation for Information Processing (Ifip) Congress 77 session whose title posed that question.

Rein Turn of TRW Systems, a consultant for the U.S. Privacy Protection Study Commission, said if the proliferation of recordkeeping continues to go unchecked, it is likely that undesirable effects regarding individuals' privacy will occur.

But, he added, the adverse effects could be caused by small, well-meaning decisions as well as by intentionally adversary decisions.

Citing driving forces behind the increase in recordkeeping, Turn said the real danger is that recordkeeping tends to be transparent to the data subject and it is therefore hard to realize that data gathering and storing on an individual is occurring.

The issue is one of control, and the laws must be dynamic to keep up with technology.

The potential for the erosion of privacy increases once the control lapses, Turn said.

"Erosion of privacy is not inevitable if controls are applied, but the potential for erosion is increasing," he warned.

Beneficent intentions can easily turn out to adversely affect privacy, he pointed out. "One can say that the computer is intrinsically innocent — just like the Saturday night handgun," he added.

Dr. F. Hondius of the Council of Europe addressed the issue of controls on data usage and asked, "How can we know about records without resorting to records of records, which smacks of Big Brother?"

He suggested that rather than looking to an independent arbiter in disputes, one should consider alternative forms, or self-control.

The Council of Europe is a body concerned with rulemaking among various countries of Western Europe and other Western nations over matters of mutual importance, such as data privacy.

Hondius recommended strongly that privacy legislation be enacted simultaneously at both national and international levels.

Individual Controls

A. Goldsworthy, past president of the Australian Computer Society, stressed the individual must be given practical and enforceable controls over his personal data.

Privacy is a part of human rights, he said, and therefore must not be eroded. There will be an erosion of privacy if DPers address technical issues to the almost complete exlusion of social ones, such as privacy, he warned.

To provide the individual with some means of preserving his privacy, Goldsworthy suggested a list of rights — to know who keeps records; to have reasonable access to records; to challenge and correct data; to be notified of changes; to designate by whom and for what purpose the data should be used; to destroy the data; and to redress through law if damaged.

Persuasion Urged

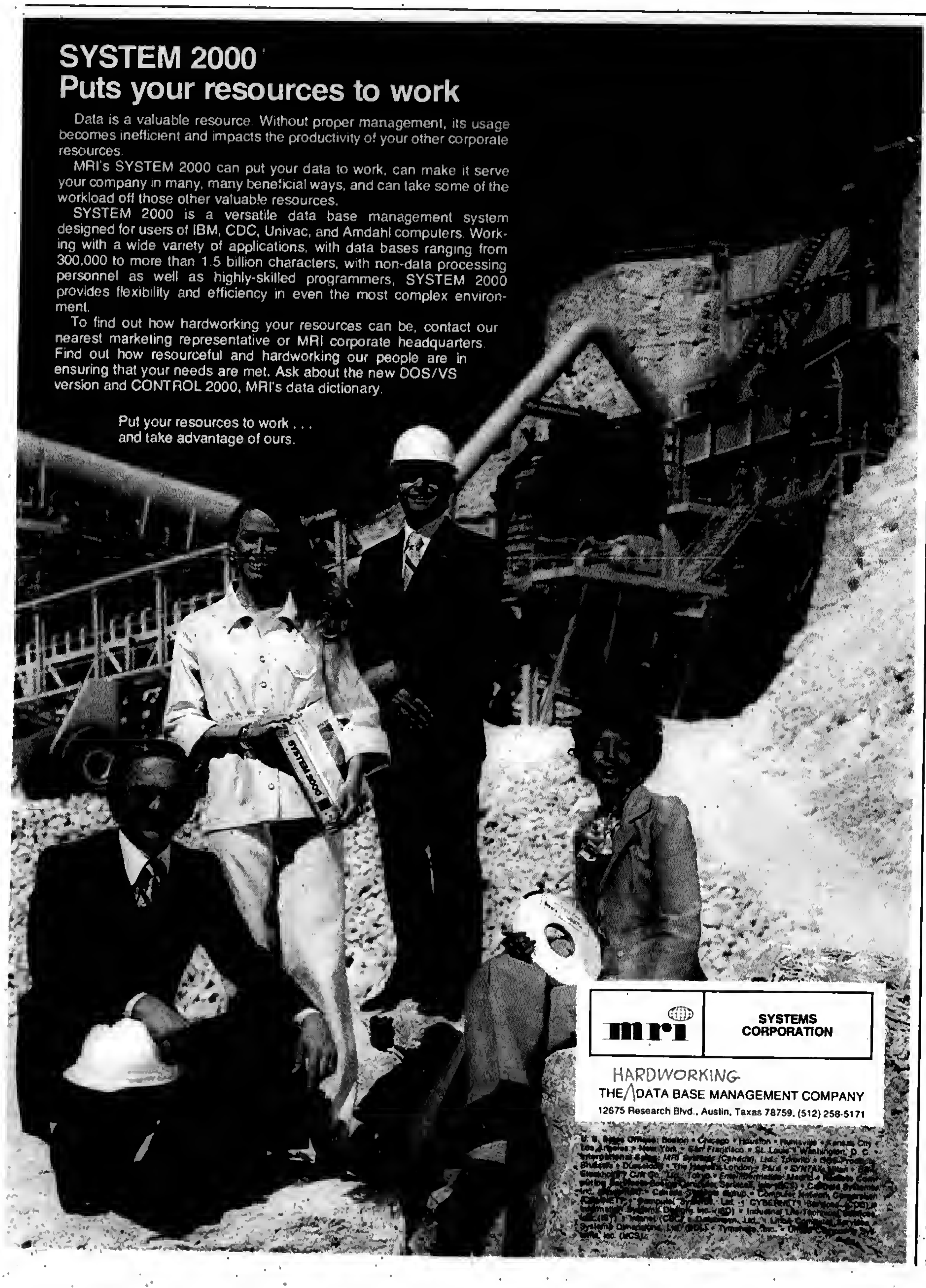
In implementing the controls available to the individual, Goldsworthy stressed universal solutions are not practical since what is regarded as private in one locality is considered public in another.

In certain circumstances, persuasion may be more effective than force, he said, indicating a privacy commission in New South Wales without enforcement power has been very effective.

Public and private sectors should be under the same control in order to guard against an organization saying it needs data for matters of national security, Goldsworthy said.

A balance needs to be struck between a government's concern to protect privacy and its willingness to give access, he continued.

An individual should not be allowed to determine what constitutes an invasion of privacy since he is a part of society as a whole, he stated.



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Games Leading the Way

DP To Equalize Human Race by 21st Century

By Toni Wiseman
CW Staff

TORONTO — Spurred by increasingly sophisticated computer-based games, computers will begin to equalize the human race by the 21st century since the real differences between men today are based on access to knowledge and knowing how to apply it.

This prediction was made by Chris Evans, who heads the Man/Computer Interaction Group at the UK's National Physical Laboratory, at the recent International Federation for Information Processing (Ifip) Congress 77 here.

Evans explained, however, that these are long-term effects. Others effects, both trivial and significant, will begin to show their effects sooner.

Evans defined one earlier time period as being short-term — between 1977 and 1980 — and another as medium-term — 1981-1999.

Lure of Games

Throughout history there has been a trend toward diminishing work time and increasing leisure time. Theorizing that this trend will continue and even accelerate throughout the rest of this century, Evans said, it is important to investigate the pyschological factors which come into play as the amount of leisure time expands.

Significant developments between 1977 and 1980 will be led by the increasing lure of games. Evans suggested that the types of games available on computers, for instance, will be very compelling and their effect on human psychology may be significant.

Additionally, during this time frame the use of games as teaching aids will become widespread as pocket calculators appear with alphanumeric displays. Finally, there will be increasing amateur software development.

By the 1980's, there will be considerable interest in computer modeling for making decisions about one's own life. "The computer can certainly be more objective, so the individual may benefit in the end," Evans stated, noting that this type of development will have potent effects on society.

In the medium term, the quest for more sophisticated and elaborate games may well give some insight into the psychology of human thought and decision processes, he said, predicting as well that the computer will beat a grand master and become the chess champion of the world during this time.

The significance of this feat is a global, conceptual one, he said, since it will mark the first time there will be no question the computer is involved in an intellectual process and is good at it.

In addition, the first major impacts of computerization on labor and employment will begin to be felt and, as a result, there will be more concentration on what man should do with his spare time.

This will result in the first consideration, the first questioning, of the value of the work ethic, Evans predicted.

Significant Changes

No predictions on the nature of the trivial effects of computerization on society can be made for the long term; it is simply too far out, Evans said. But there are several significant changes which can be forecast.

One "eerie" effect will the the advent of the first "really good" artificial intelligence system, whcih may well be an exceptionally good companion, Evans said. Intellectual exchanges with such systems may prove to be very interesting, perhaps more interesting than with humans.

In addition, highly sophisticated games with enormous simulation properties may make people more introverted and cut down on the amount of travel they do, he said, noting the effect this could have on the world's economy.

The need for social contact may well lessen, Evans suggested, citing documented cases in which health authorities have found the students who interact for long periods with computers were more strongly oriented to the machines than to people and had psychological problems.

At this point in time, major decision making on personal and social problems may be done on computers. In fact, it may be "the only way to go," he said. The psychosocial consequences will be enormous, he pointed out.

Finally, present political systems, which are based in the past, will be unlikely to survive in the world of that day, he said. They will simply not be able to adjust to the rapid rate of change.

Two things are likely to arise in the future, Evans said. First, man will no longer be diverted by the need to work; working will no longer be "the real thing."

Secondly, as a result of the first, man will be forced to start looking at the nature of the human mind and at the nature of the universe, both of which he currently knows little about.

"This all sounds optimistic," Evans admitted, but "it may be that knowing too much about the universe and ourselves is not desirable. It will definitely be a shock, and not necessarily a pleasant or good one."

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DP Ombudsman Tackling Consumer Gripes

By Nancy French
CW Staff

TORONTO – The Canadian Information Processing Society (Cips) is operating an ombudsman service here and in Vancouver to help consumers deal with problems arising from their relations with computers.

James H. Finch, who serves as the Toronto-area ombudsman, said the service was established to serve as a back-line resource for the many other ombudsman-type organizations that already exist, rather than to usurp their authority.

The idea was born in Vancouver two-and-a-half years ago when Ted Sterling, a Cips member who heads the Computer Science Department at Simon Fraser University, joined forces with the Consumers Association of Canada and volunteer caseworkers recrutied from the school. This three-part team was aimed at helping business and government DP departments.

The ombudsman tackles a consumer's problem only after the consumer already tried to solve it himself and failed, Finch said.

The Toronto service was established in February. Business for Finch and his 14 volunteers was "pretty slow" for the first two months because the news of the service "wasn't getting to the man on the street," he explained.

Now, however, the ombudsman has handled about 18 cases, many of which were resolved in less than an afternoon, he said.

One case resolved recently involved a firm that couldn't seem to get its tax refund from the Department of National Revenue (comparable to the U.S. Internal Revenue Service).

The case had "ping-ponged between the regional and national offices, Finch said, and his group expedited the thing through the DP department, quickly resolving the problem.

Finch said DP departments are frequently "embarrassed into making the changes. We're actually commissioned on behalf of the DP community to perform this service."

As a by-product to solving individuals' problems, Finch's group hopes to provide feedback to industry on what some of the typical problems are and to eliminate them at the source.

As for why companies allow consumers' problems to occur and then go on so long without being resolved, Finch said many of the companies' DP departments are "too busy on programming. They don't spend time on the user interface. Further, the systems are biased toward the provider of the system rather than the customers."

Still another reason, according to Finch, is that programs are not properly debugged. Because of costs, many DP departments are prepared to live with a few problems, he added.

The Canadian program is different from the ombudsman program established by the Association for Computing Machinery in the United States in 1971, according to Dahl Gerberick.

Call for Papers

1978 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) REGION FIVE ANNUAL CONFERENCE, Tulsa, Ok., April 16-18, 1978.

The theme of the conference is 'Energy '78.' Topics will include new energy sources, energy conservation, control and instrumentation of energy systems, energy transmission and transportation systems, energy storage, economics of energy systems and alternatives, efficient utilization of energy resources.

Three copies of 200-word abstracts should be sent by Nov. 1 to Dr. R. Ramakumar, Technical Program Chairman, School of Electrical Engineering, 202 Engineering South, Oklahoma State University, Stillwater, Ok. 74074.

EIGHTH CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY, New York City, April 10-13, 1978.

Papers are requested on any aspect of DP audit, control and security, particularly how-to papers, case histories and accounts of personal experiences with advanced systems. Papers outlining the development of new techniques or modifications of old ones or providing insight into problems facing computer audit, control and security professionals are also being sought.

A one-page abstract, along with a brief personal resume, should be sent by Nov. 1 to Harold Weiss, Program Chairmen, Automation Training Center, Inc., No. 17, 11250 Roger Bacon Drive, Reston, Va. 22090.

PERCOMP '78, Long Beach, Calif., April 28-30, 1978.

The show is designed with the home computerist and business person in mind. Technical papers are encouraged in the following areas: ham radio communications or computer and amateur radio, speech synthesis and recognition, pattern recognition, music generation, programmed learning applications, bit-slice architecture, real-time machine control, software tutorials and business applications.

Three copies of an abstract, in English, should be sent by Oct. 31 to James H. Lindwedel, Percomp '78, 1833 E. Seventeenth St., Ste. 108, Santa Ana, Calif. 62701.

NATIONAL MICROGRAPHICS ASSOCIATION'S 27TH ANNUAL CONFERENCE AND EXPOSITION, Boston, Mass., May 8-12, 1978.

Papers are requested in the areas of technology, fundamentals, implementation, applications and other special interest needs covering the broad field of micrographics and related information-processing fields.

Possible topics include source document preparation; readers/reader-printers and enlargers; retrieval devices; camera and duplicating; COM start-up/COM ongoing; COM graphics; computer-assisted retrieval; standards; privacy legislation and freedom of information; micrographic systems and design; service bureau and/or in-house; micropublishing; word processing and micrographics; non-impact printing and/or COM.

Abstracts, typed double-spaced and at least 250 words long, should be sent by Sept. 9 to R.H. Kinney, Micrographics '78, Program Review Committee, National Micrographics Association, 8728 Colesville Road, Silver Spring, Md. 20810.

1978 NATIONAL COMPUTER CONFERENCE, Anaheim, Calif., June 5-8, 1978.

Papers and session proposals are welcome. Emphasis will be on the following areas: applications — world resource planning, exploration and development with emphasis on energy; electronic funds transfer; office automation; image processing; artificial intelligence; special-purpose terminals and systems; design automation and graphics; computers as a component of end-user products; small business; manufacturing and process control; data entry; personal computing; and simulation.

In methodology and techniques, papers are invited on software tools and techniques, programming methodology, DP management and administration, performance measurements and evaluation and automatic programming.

In people and society, the emphasis will be on legislation and its impact, communications and regulatory policy, computing careers and education, privacy, security and computer abuse.

In systems, NCC will emphasize computer architecture, impact of new hardware technology, distributed systems, data networks and communications, data base management systems, programming and operating systems.

Short papers of 2,500 words and long papers of 5,000 words will be considered. Include six copies of the paper and six copies of a title page containing title, 150-word abstract, four to six key words descriptive of the content, author's affiliation, telephone number and mailing address.

Submissions should be sent by Oct. 21 to Dr. Leonard Y. Liu, NCC '78 Program Chairman, IBM Research Laboratory, K51/282, 5800 Cottle Road, San Jose, Calif. 95183, or to Dr. Sakti P. Ghosh, NCC '78 Program Vice-Chairman, IBM Research Laboratory K55/282, 5800 Cottle Road, San Jose, Calif. 95183.

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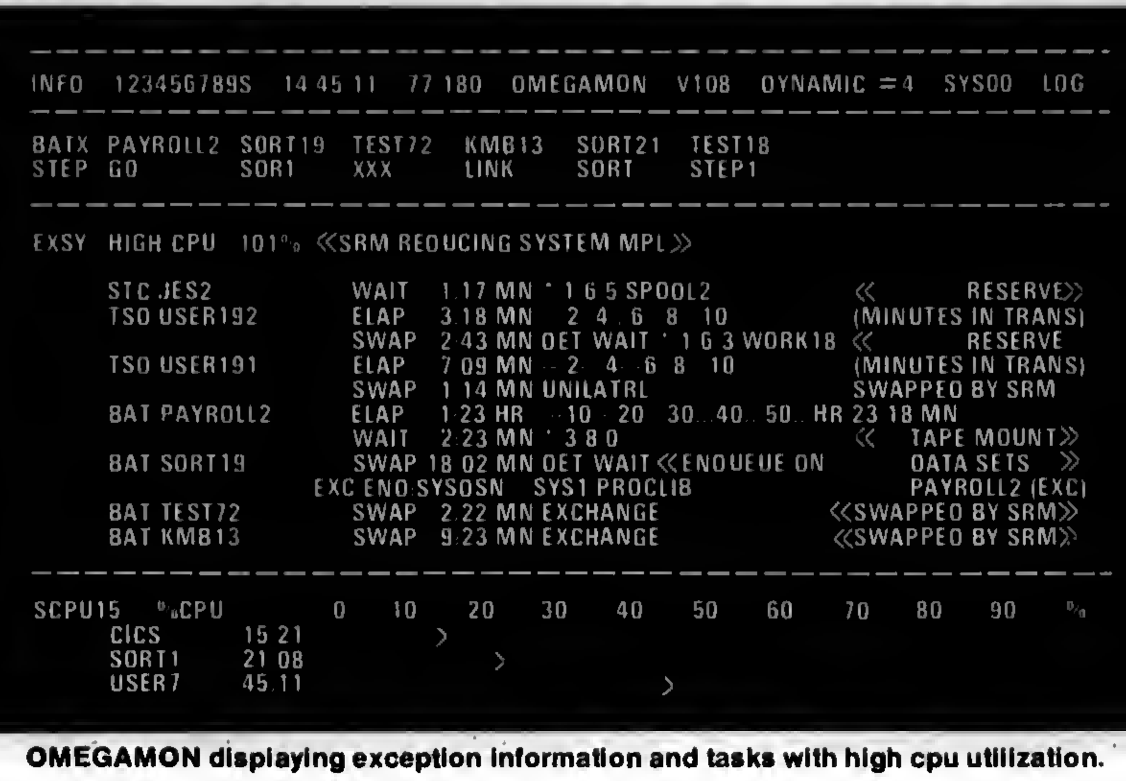
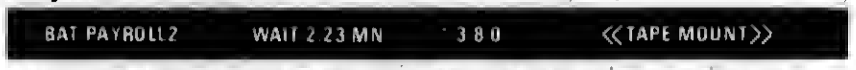


```
INFO   123456789S   14 45 11   77 180   OMEGAMON   V108   OYNAMIC =4   SYS00   LOG

BATX  PAYROLL2  SORT19  TEST72   KMB13   SORT21   TEST18
STEP  GO        SOR1    XXX      LINK    SORT     STEP1

EXSY  HIGH CPU  101%  <<SRM REOUCING SYSTEM MPL>>

      STC JES2         WAIT  1.17 MN ' 1 6 5 SPOOL2          <<        RESERVE>>
      TSO USER192      ELAP  3.18 MN   2  4 . 6   8   10      (MINUTES IN TRANS)
                       SWAP  2.43 MN OET WAIT ' 1 6 3 WORK18 <<        RESERVE
      TSO USER191      ELAP  7 09 MN -- 2   4  6  8   10      (MINUTES IN TRANS)
                       SWAP  1 14 MN UNILATRL                 SWAPPEO BY SRM
      BAT PAYROLL2     ELAP  1.23 HR  --10 - 20  30...40...50.. HR 23 18 MN
                       WAIT  2:23 MN ' 3 8 0                 <<   TAPE MOUNT>>
      BAT SORT19       SWAP 18 02 MN OET WAIT <<ENOUEUE ON       OATA SETS   >>
                   EXC ENO:SYSOSN   SYS1 PROCLIB                 PAYROLL2 (EXC)
      BAT TEST72       SWAP  2.22 MN EXCHANGE               <<SWAPPEO BY SRM>>
      BAT KMB13        SWAP  9.23 MN EXCHANGE               <<SWAPPEO BY SRM>>

SCPU15   %CPU          0    10    20    30    40    50    60    70    80    90    %
      CICS      15 21             >
      SORT1     21 08                  >
      USER7     45.11                                >
```

OMEGAMON displaying exception information and tasks with high cpu utilization.

How many of these problems do you have?

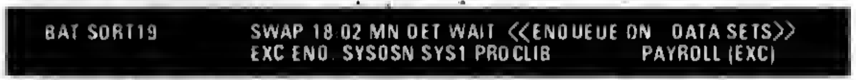
Tape Mounts?



```
BAT PAYROLL2        WAIT 2.23 MN       ' 3 8 0          <<TAPE MOUNT>>
```

Batch job PAYROLL2 waiting 2 minutes 23 seconds on a tape mount.

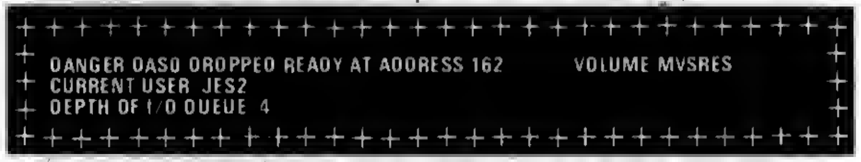
Enqueue Waits?



```
BAT SORT19          SWAP 18:02 MN OET WAIT  <<ENQUEUE ON   OATA SETS>>
                    EXC ENO. SYSOSN SYS1 PROCLIB           PAYROLL (EXC)
```

Batch job SORT19 swapped out (detected wait) for 18 minutes 2 seconds due to enquaue on data set SYS1.PROCLIB currently held by job PAYROLL.

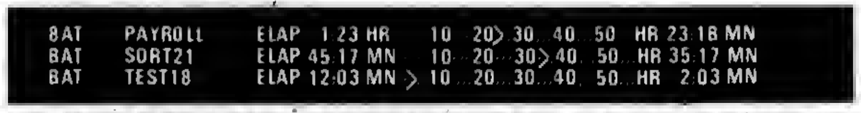
Dasd Dropped Ready?



```
+ + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +
+                                                           +
+ OANGER OASO OROPPEO READY AT AOORESS 162     VOLUME MVSRES +
+ CURRENT USER  JES2                                        +
+ OEPTH OF I/O OUEUE  4                                     +
+ + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +
```

Dropped ready exception indicatas addrass, volume, user and number of I/O's waiting on device.

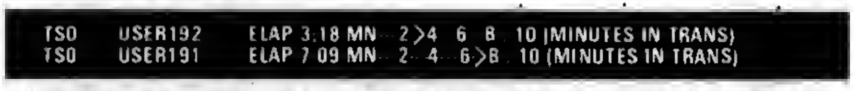
Initiators Tied Up?



```
8AT    PAYROLL    ELAP   1.23 HR     10  20> 30...40...50   HR 23:18 MN
BAT    SORT21     ELAP 45:17 MN      10--20--30> 40. 50...HR 35:17 MN
BAT    TEST18     ELAP 12:03 MN >  10...20...30...40. 50...HR   2:03 MN
```

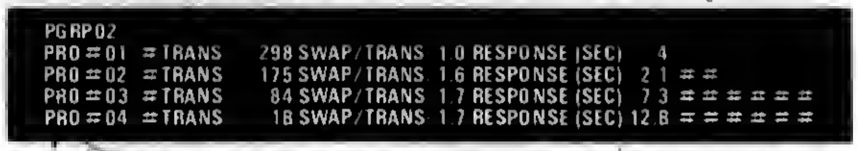
Elapsed time axception analysis tor batch jobs. Thresholds are assigned on a job class basis (1 hr for PAYROLL, 10 min. for SORT21 and TEST18). Elapsed time is on laft, "over-tima" on right, and plot ot over-time in betwaen.

TSO Response Time?



```
TSO     USER192     ELAP 3:18 MN -- 2 >4   6   8 . 10 (MINUTES IN TRANS)
TSO     USER191     ELAP 7 09 MN -- 2 - 4 -- 6 >8 . 10 (MINUTES IN TRANS)
```

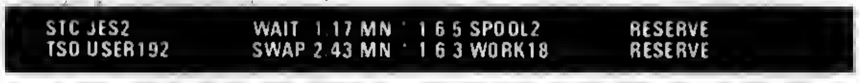
TSO rasponse time exception analysis. Time thresholds are assigned on a trensaction "period" basis.



```
PGRP02
PRO =01  =TRANS    298 SWAP/TRANS  1.0 RESPONSE (SEC)     4
PRO =02  =TRANS    175 SWAP/TRANS. 1.6 RESPONSE (SEC)   2 1 = =
PRO =03  =TRANS     84 SWAP/TRANS  1.7 RESPONSE (SEC)   7 3 = = = = = =
PRO =04  =TRANS     18 SWAP/TRANS  1.7 RESPONSE (SEC) 12.8 = = = = = =
```

TSO rasponsa time information by period number (ie. by complexity ot transaction.)

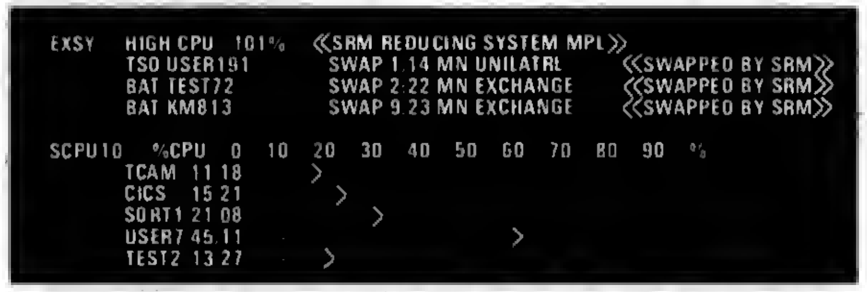
Reserve Lock-outs (Multi-system environment)?



```
STC JES2            WAIT  1.17 MN ' 1 6 5 SPOOL2         RESERVE
TSO USER192         SWAP 2.43 MN  ' 1 6 3 WORK18         RESERVE
```

In a multi-system anvironment with sharad dasd, RESERVE lock-out datection can be crucial. When running V=R and EXCP to a 3270, OMEGAMON requires no I/O to dasd davicas or control units and is not affected by console lockouts (WTO/WTOR).

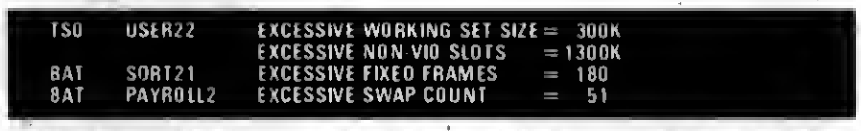
SRM Swaps?



```
EXSY    HIGH CPU   101%    <<SRM REDUCING SYSTEM MPL>>
        TSO USER191          SWAP 1.14 MN UNILATRL          <<SWAPPEO BY SRM>>
        BAT TEST72           SWAP 2:22 MN EXCHANGE          <<SWAPPEO BY SRM>>
        BAT KM813            SWAP 9.23 MN EXCHANGE          <<SWAPPEO BY SRM>>

SCPU10    %CPU    0    10    20    30    40    50    60    70    80    90    %
        TCAM   11 18         >
        CICS   15 21            >
        SORT1 21 08                 >
        USER7 45.11                                  >
        TEST2  13 27          >
```

The high cpu utilization causas the systam resourcas manager to reduce the number ot active tasks (MPL) in tha system. As a result we see a TSO user having to wait tor 1 minuta while 2 batch initiators are frozen tor a total ot 11 minutes. The SCPU10 command salects any task using mora than 10% ot the cpu. (Nota TSO usar USER7 had 45.11% cpu utilizetion which indiractly caused the batch jobs to ba swapped out)

Storage Exceptions?



```
TSO     USER22      EXCESSIVE WORKING SET SIZE =  300K
                    EXCESSIVE NON-VIO SLOTS    = 1300K
BAT     SORT21      EXCESSIVE FIXEO FRAMES     =  180
8AT     PAYROLL2    EXCESSIVE SWAP COUNT       =   51
```

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Inconsistent Data Seen Major Snag in Planning

By Molly Upton
CW Staff

TORONTO — The bane of corporate planners is inconsistent data garnered from various operating units, panelists indicated at a session on "Interactive Approaches to Corporate Planning and Control" at the recent International Federation of Information Processing (Ifip) Congress 77 here.

What is needed is a higher construct language that requires uniform data and allows planners to access information on such concepts as unit maintenance cost, according to Paul Strassmann, director of administration at Xerox Corp.

Amidst several supposedly happy users of APL, Strassmann said "APL as a planning language is dead, to overstate the case." In due course it will be dead, since it is hard to use as a "lingua franca."

He asked time-sharing vendors to diversify their syntax into other aggregate levels of expression as a means of moving toward the higher construct languages.

Strassman said he urges the people who invented APL to try to bridge the gap and take the discipline of data base management into the unstructured world of the planning organization.

He added he was addressing no one in particular, but the audience chortled since I.P. Sharp, one of the inventors of APL, was the chairman of the session.

It is necessary to reveal in an understandable manner the logic and the source of the data underlying the constructs, Strassmann added.

Distributed Function

Strassman envisions the data base management function being distributed into operating units. There will be more interdisciplinary use of the planning data, for instance, by marketing and manufacturing departments, he said.

While other panelists described their use of APL and praised its conciseness and interactive abilities, they did indicate they have trouble obtaining data from different operating units that is consistent.

Sharp, of I.P. Sharp Associates, Ltd., described corporate planning as applying exact methods to hopelessly inaccurate data. "But that adds to the fun," he remarked.

Morris Elliott, general research manager for Massey Ferguson Ltd., said the firm's organization along decentralized lines often makes it difficult to combine data from the different operating units.

Elliott's unit stresses giving practical, down-to-earth assistance to planners, he said.

In order to coax the operating units into collecting the desired data, Elliot's group in turn tries to provide them with systems that help in planning. "We can't expect the operating units to supply data if they can't use it themselves," he observed.

Massey Ferguson's system is easy to use for business analysts without programming knowledge, he said. It encourages the decision maker to experiment with the data, although he admitted it is not the executive but the business analyst that sits at the terminals.

The firm is starting to initiate a data base type of approach, he said. "By adopting a data base we hope to eliminate arguments over whose data is accurate," Elliott added.

Leo Kahn, head of the operations research department at the Nederlandsche Middenstandsbank in Amsterdam, said the bank uses simulation models, plugging in specific companies, to estimate such factors as credit worthiness.

John White, a planner in the Wellcome Foundation, Ltd., a drug company, said only simple and financial modeling has any place in real-life planning.

Planning systems must be along the lines of personal models that can be understood, he said. Although DP tends to err on the point of incomprehensibility, it can be timely, he admitted.

Wellcome converted to DP and APL in 1975. It wrote its own macro language that allows overseas companies to access its data, White said. The whole conversion was "done rapidly and cheaply and accepted readily by an organization very unsophisticated in DP use," he added.

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IDMS	3.8	3.3	3.4	3.6	3.0	3.6	3.5
SYSTEM 2000	3.0	2.6	3.0	3.0	2.5	3.0	3.0
TOTAL	3.5	3.1	3.4	3.4	2.8	3.0	2.8

All figures based on latest available Datapro survey.
*All weighted averages are based on a scale of 4.0 for excellent.
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Seminar Schedule

September			
Chicago	Wed.	Sept.	7
Seattle	Tues.	Sept.	13
San Francisco	Thur.	Sept.	15
Denver	Tues.	Sept.	20
Phoenix	Thur.	Sept.	22
Milwaukee	Thur.	Sept.	29
October			
Minneapolis	Wed.	Oct.	5
Dallas	Tues.	Oct.	11
New York	Tues.	Oct.	11
Atlanta	Thur.	Oct.	13
Hartford, CT	Tues.	Oct.	25
Salt Lake	Thur.	Oct.	27
Rochester, NY	Thur.	Oct.	27
November			
Portland, OR	Tues.	Nov.	1
Indianapolis	Wed.	Nov.	2
Des Moines	Wed.	Nov.	9
Boston	Thur.	Nov.	10
Rochelle Park, NJ	Tues.	Nov.	15
White Plains	Thur.	Nov	17
Philadelphia	Tues.	Nov.	22
Houston	Tues.	Nov.	29
Albuquerque	Wed.	Nov.	30
December			
Miami	Thur.	Dec.	1
Cleveland	Tues.	Dec.	6
Pittsburgh	Thur.	Dec.	8
St. Louis	Tues.	Dec.	13
Cincinnati	Thur.	Dec.	15
January			
Detroit	Tues.	Jan.	17
Columbus, OH	Thur.	Jan.	19
Memphis	Tues.	Jan.	24
Washington, DC	Thur.	Jan.	26
Kansas City	Tues.	Jan.	31
February			
Nashville	Thur.	Feb.	2

Systems Consultant Contends

Distributed Processing Not Commercial Reality

By Nancy French
CW Staff

TORONTO — Although trade journals "laud the number of distributed processing systems available," from an information standpoint there are no commercially marketed products that actually provide for management of data structures at multiple sites, according to Kurt Ziegler Jr., a systems consultant with IBM in Gaithersburg, Md.

Speaking at a session entitled "Future Directions In Information Management" at the recent International Federation for Information Processing (Ifip) Congress 77 here, Ziegler told his audience that information systems control essentially four types of distribution: distributed functions, distributed systems, distributed processing and distributed data.

"Although many installations use some form of distributed systems, few vendors actually provide such facilities as part of their information systems offerings," he said.

Distributed processing is just now becoming a viable alternative to the single-host approach for distribution of data and processing, he said.

Distributed Functions

The only equipment currently available is that which distributes functions, Ziegler said. In this category he included intelligent terminals, which provide basic editing features, clusters, which provide source data editing and some simple status facilities; front-end processors, which provide transmission, conversion and routing facilities; and now "back-end processors," which provide data retrieval and output services.

As for "distribution of systems," Ziegler pointed out that large multinational corporations have had distributed systems for years — and that these systems aren't necessarily small ones, either. Here each installation typically has its own DP staff and specific business systems and appears as an "autonomous entity."

However, when it becomes necessary to exchange information between the users of the systems, it is done through a message-switching facility. This arrangement lets the user enter data at his terminal; the switch routes that information to the destination system.

Transactions requiring access to data at multiple sites can be accommodated via store-and-forward techniques, although these can present significant transmission time and volume overhead penalties as well as system recovery exposure, Ziegler warned.

An alternative approach to the store-and-forward distributed systems for multiple-locations data requests is distributed processing, he said. Here the front-end function must route not only by transaction type, but also by content, he explained.

The first execution point becomes the anchor point, he said. This application program isues transactions to other processors to access remote data; unlike the store-and-forward approach, the originating transaction does not terminate until all the transactions respond to the originating transaction.

The response then goes from the originating application program to the requestor.

Distributed processing appears to meet the goals of off-loading and availability, although it can dramatically affect response time while at the same time exposing the data base to some erroneous data, he explained.

Distributed Data

"Distribution of data" is the last variety of distribution Ziegler described. This, he said is the "easiest type to program," although it is "the most complex for the information system to support in terms of performance, control, recovery and synchronization," he said.

If the processors are geographically distributed, the same response exposure exists as for the distributed processing environment.

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TASK/MASTER	3.3	3.2	2.8	3.3	2.5	2.7	2.7
ENVIRON 1	3.1	3.1	3.2	3.1	2.3	2.5	2.5
CICS	3.1	2.8	2.4	2.8	2.8	2.9	2.8
INTERCOM	2.7	2.8	2.2	2.5	2.1	2.1	2.5
IMS/DC	2.8	2.5	2.4	2.5	3.0	2.9	2.8

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—Harvey Kennedy, Vice President and Director of Management Systems, Southern Baptist Annuity Board (Dallas).

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—Ben Driver, Data Base/Data Communications Software Manager, Brockman On-Line Systems (Houston).

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Experts Urge Simple Interface for Naive Users

By Toni Wiseman
CW Staff

TORONTO — Systems designed for use by "the naive user" should keep the complexity within the computer, not at the terminal, a panel of experts agreed here recently.

Unfortunately, that is easier said than done, attendees of the International Federation for Information Processing (Ifip) Congress 77 were told.

As you make the system appear simpler to the user, you inevitably make the software more complex, Don Bitzer, director of the University of Illinois' computer-based educational center, admitted.

Bitzer defined the "naive user" not just as one who is not knowledgeable in terms of DP, but also as anyone who is physically handicapped and therefore may not have acquired certain communication skills.

In fact, he said, even DP experts might be categorized as naive because they may know nothing of a particular computer-based system.

In outlining some of the criteria which have been used in the develoment of the Plato system, Bitzer emphasized the importance of keeping the target audience in mind, since most other criteria hinge on that point.

To be successful, communication with the user must be direct, he said. This means the computer must be able to communicate in a variety of ways.

Information must also appear to the user in a natural way.

The system must also be able to interact with the user at the conceptual level, he said.

Linguistic Issues

Sabina Rohlfs of Softlab GmbH, Germany, described some of the finer ponts behind the linguistic issues in communications with naive users.

She defined a naive user as anyone who has to use a computer to do a job in which he previously communicated with another human. This means the computer is simply a special-purpose machine and therefore needs instructions for use just as would be provided with a washing machine or a car.

Three Points

Rohlfs observed that the three main points in language design are to make the commands simple, provide explanations in short sentences and adjust the language to the specific target group. For instance, if asked a question such as "Do you suffer from headache or cold?", depending on his familiarity with the study of logic a user might interpret "or" as meaning "either or" or alternatively as meaning "both," she said.

Human-to-human communication includes both a content aspect and a relation aspect, she noted.

With a computer, the content is translated into a digital form with a syntax.

The relation aspect, however, is analog communication which has no clear syntax from which to draw a conclusion. She illustrated this point by noting tears could imply either joy or sorrow. "And there is no way to include this aspect of communication in a computer system," she told attendees.

Office Systems

Jim Bair, senior information scientist at Stanford Research Institute, examined some of the problems with office information systems, some solutions and some of the problems with the solutions.

The problems include the "incredible" spectrum of users with their variety of job types and organizations, the wide range of potential services desirable and the heavy usage imposed on a system if all services are available to all users.

Further Complication

The tremendous variety of hardware, software and networks available and the rapid change in people and technology further complicate the situation, he told Ifip attendees.

By way of solutions, Bair proposed one single language for all commands and communication. This language, he stated, should be a subset of natural language with one consistent syntax. This language should be used for both current and future systems, he stated.

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UK's Tricker Believes

Corporation's Structure, System Interdependent

By Molly Upton

Insert Here

TORONTO — Which comes first, the organizational structure or the information system?

The two are interdependent and, in fact, it is feasible to develop an organizational structure based on the design of the information system, Robert I. Tricker, director of the Oxford Centre for Management Studies, told a session at the recent International Federation for Information Processing (Ifip) Congress 77 here.

The issue is what kinds of interdependence ought to be developed, rather than which is dependent on the other, Tricker said.

The role of the information systems planner is therefore expanding to encompass influence on the corporate structure and, indirectly, possibly even on future society, he speculated.

Often there is a generation gap in management's conception of the role and potential of information systems, he told the session on "The Impact of Information Systems on Organizational Thinking."

"The changing role of management, from responding to environmental change to causing it, places a new dimension on the need for information in management decision," Tricker said.

"There are emerging pressures which identify information with power. And many existing information systems fail to respond to these contemporary needs.

"By thinking of management information as the outcome of human processes, looking beyond the technical and operational levels, the information system designer is contributing to the evolution of his organization to higher levels of coherence, connectedness and fruitfulness for all concerned. He may also be enabling it to survive," Tricker commented.

Data vs. Information

There is an important distinction between data and information; information "is a function of the user and his environment as well as of the data made available," Tricker stressed.

"We have probably not thought enough about the process by which data becomes information at the strategic decision-making levels," he continued. "In high-level decisions, information is not a commodity to be moved, stored and traded; it is, as [Norbert] Wiener said, what changes us, and change implies process."

Information "results from an idiosyncratic process of using data by individuals in specific circumstances," he explained.

The epitome of formulating information is the association of two previously unrelated planes of data in a resultant idea or concept, according to Tricker.

> *'The epitome of formulating information is the association of two previously unrelated planes of data in a resultant idea or concept.'*

Building on his thesis of the interdependence of the information system and organization, Tricker said, "Those of us involved in information system development are in the business of facilitating the process by which information is created."

One way to accomplish this would be to "increase the information potential — that is, to heighten the probability of two or more apparently unrelated planes of data being associated to trigger an information response in the recipient user."

This means "including the decision maker in the higher level information system. He is the information processor in the loop, supported by operational and technical-level data processing.

"The power of this interaction, with modern technology and comprehensive operating level support, has a high potential.

"This does not necessarily imply massive on-line support to the board room or executive desk. It does mean much closer interaction and the facilitation of search processes," he explained.

"But just as the information systems for management that have been developed to date have tended to concentrate on making data available, so management education has concentrated on the user, attempting to broaden his ability to identify his information needs and to obtain value from the data available to him. Perhaps the time is ripe to combine the two."

In the next stage of organizational evolution, the higher orders of organization "are those with the more coherently connected and interrelated parts."

Rather than being simply an increase in the number of communications channels, organizational intelligence may "simplify unnecessary complexity by concentrating on the development of coherent, related and fruitful systems at the technical and operational levels," he said.

"The job of the information systems planner operating at this level is to improve organizational intelligence by increasing the information potential and thereby enabling the organization to respond to environmental change and to cause it," Tricker said.

Participants in seminars at the Oxford Centre have indicated top management is concerned with information and power, he said. The three things expected to have the greatest impact on information system development in the next decade are internal organizational problems, involvement in the organization by third-party interests and external factors Tricker indicated.

"The new challenges faced by management in large organizations point toward new horizons for those responsible for information and control system developments in those organizations," he observed.

With the pressure for "industrial democracy" has come the increasing importance of information.

"Those with access to information and particularly those involved in its communication and supply can be on the cutting edge of social change. No longer is information the apparently free good available to economic man. It can be looked as a costly yet highly valuable resource," Tricker concluded.

Afips Publishes NCC Papers

MONTVALE, N.J. — The proceedings of the 1977 National Computer Conference held last June in Dallas have been published by the American Federation of Information Processing Societies (Afips).

The 1,000-page hardcover publication includes 132 original papers presented at the conference on such topics as data base administration, computer systems architecture, computer graphics and clinical applications of computers.

Microprocessor architectures, software management, computer hardware design, data structures, applications of computer networks and personal computing are also covered.

Copies of the proceedings are available for $60 each from the Afips Press at 210 Summit Ave., Montvale, N.J. 07645. Members of Afips constituent societies will receive a 50% discount if their orders are prepaid.

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Users' Report...

"Winning Proposal" Winning Big!

A step-by-step guide to proposal preparation entitled *How to Create a Winning Proposal* is helping computer/EDP marketeers score big wins in their proposal efforts. In a recent publisher's survey, users of the book reported an impressive 42% average increase in the success-ratio of their proposal projects during the past year. Of the users polled, 68% attributed their successful track-record to the guidelines provided in the book.

Dubbed "Winning Proposal" in marketing circles, *How to Create a Winning Proposal* is rapidly becoming the standard text for use in computer/EDP hardware, software and service company proposal efforts. The book covers the entire proposal process . . . giving detailed instructions on contents, structure and methods of preparation for both solicited and unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases.

Government requirements are covered in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its "win probability" in competing for contracts. Excellent guidelines on how to analyze and respond to RFP's, RFQ's and IFB's are also included.

Copies are available pre-paid only from Mercury Communications, Inc. 730-CW Mission, Santa Cruz, CA 95060. $55 includes 3-5 day delivery inside USA. In Calif. add $3.12 tax.

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Editorials

Outstanding Event

The effect of computers on employment. The social accountability of computing. Computers and leisure time activities. The effects of computers on job satisfaction.

There were sessions on all these important topics, plus more than 100 others dealing with every conceivable subject in the world of data processing, during the recent week-long Congress 77 held by the International Federation for Information Processing (Ifip) in Toronto.

The program was clearly the best ever in terms of content — and not only the best ever for Ifip, but also the best for any conference designed for people in the computer community.

Ifip, with its strong international spirit, draws from among the most thoughtful people in the DP field around the world. This was clear not only in the organized program, but also from the well-prepared audience questions and from the general discussions around the session areas and exhibit floor.

Of course, with only 9,000 attendees the show did not compare with the attendance at the National Computer Conference in the U.S., the French Sicoh or the German Systems 77. But in many ways a comparison in terms of numbers alone is unfair.

The other shows are primarily occasions for the industry to display — and sell — its equipment. They are made more palatable by technical sessions which range from the excellent to the mundane, but none match the intellectual stimulation and thoughtful discussions of Ifip.

Unfortunately, it will be another three years before the next Ifip show, and that one will be a long way from home for U.S. and European attendees. It will be held for one week in Tokyo and another week in Melbourne, Australia.

But for those who will be able to attend that show, it will be worth their while, even if it is just half as meaningful as the recent Toronto session.

Say Hello

A frequent theme of the recent Ifip show was the need for increased interpersonal communication among the people in the DP world and among the users of their wares.

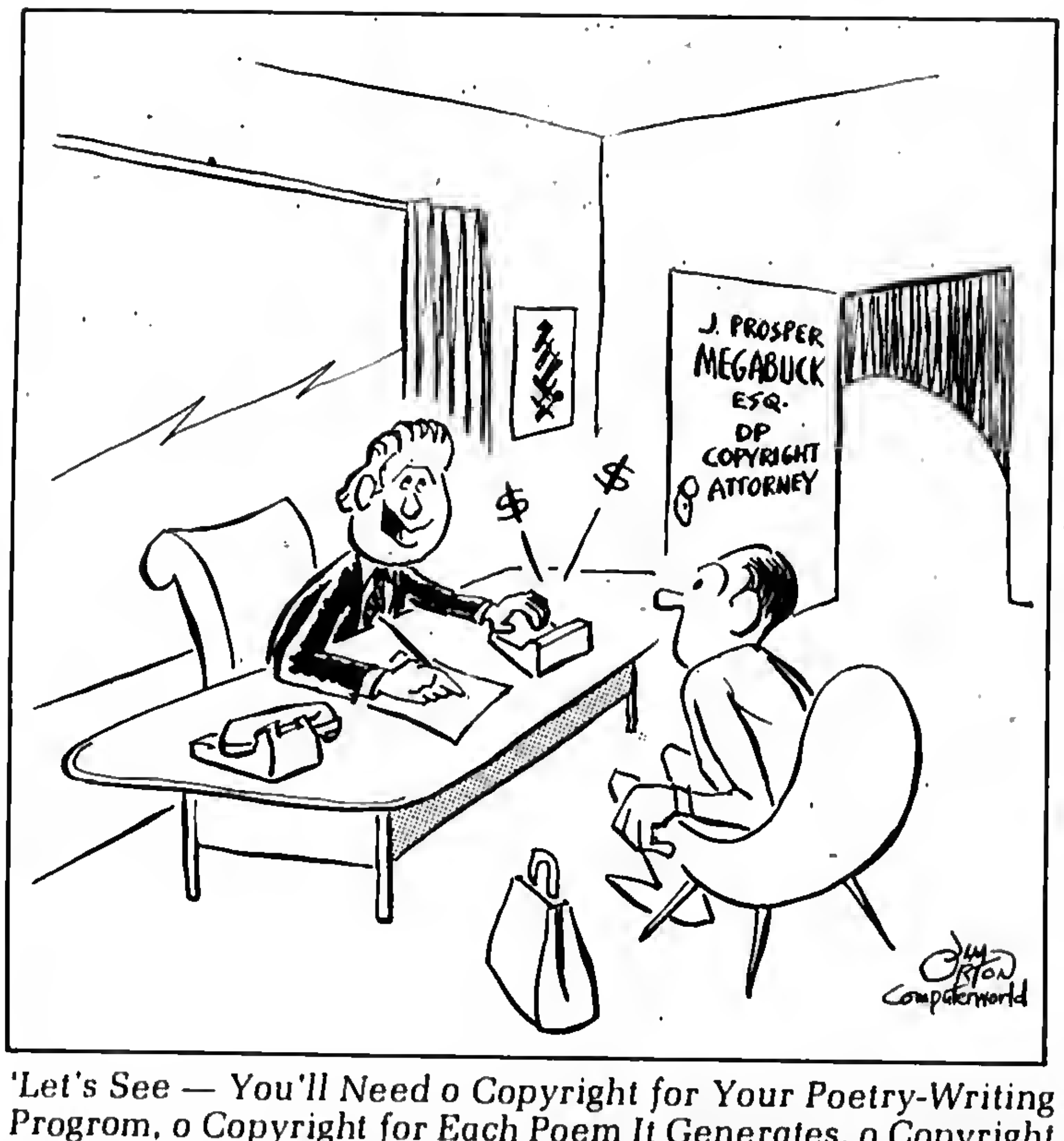
This is a hopeful sign.

Admittedly, DPers may have taken a long and tortuous path toward the conclusion that what is important is not really data, but rather communication with others.

According to both prepared and impromptu remarks at Ifip, many DPers are now realizing the technology of computers and communication both on a national and international level.

But in the meantime don't forget that interpersonal communication can also be a very simple function performed without the aid of machines.

Say hello to your neighbor today.



'Let's See — You'll Need a Copyright for Your Poetry-Writing Program, a Copyright for Each Poem It Generates, a Copyright for the Program That Prints the Copyright Notice for Each Poem . . .'

Letters to the Editor

DOD's Software Spending

The Aug. 8 issue of Computer*world* contained an article ["PDP-11 Leading Choice for Military Standard"] mentioning the selection of the PDP-11 architecture as the leading candidate for the standard computer family architecture. In that article it was also mentioned that the Department of Defense [DOD] "spends $3 million on software development, according to figures from the Office of the Secretary of Defense."

Actually, I think the quoted $3 million was a typographical or transcription error. The real figure was closer to $3 *billion* in 1973.

Quoting from a paper on life-cycle cost modeling of computer family architectures that appeared in the 1977 National Computer Conference Proceedings: "D.A. Fisher ["ADP Costs in the Defense Department," Institute for Defense Analyses, Arlington, Va., October 1974] estimated in fiscal year 1973 DOD spent $6.2 billion to $8.2 billion on ADP. He found that approximately one-third of this amount originated in each service and that about 16% of the total went to computer hardware, 45% to software and 38% to other ADP costs, such as support and supplies, keypunching, and computer operation.

"Using these figures we deduced that $1 billion to $1.3 billion went to computer hardware and roughly $2.8 billion to $3.7 billion went to software."

John J. Cornyn
NSTL Station, Miss.

Wanted: Legal/DP Dialogue

In recognition of the frequent legal and ethical problems raised by Computer*world*'s articles and readers' letters, it might be of interest and mutual benefit to start another level of discussion.

I am presently chairing the Subsection on Computer Abuse, Science and Technology Section, American Bar Association. The members of this subsection have requested me to develop a dialogue with any organizations and/or individuals in DP who would be interested.

Object: mutual understanding of our two professions' problems in our inevitable relationship.

I can be reached at the District Attorney's Office, Planning Section, Alameda County Court House, Oakland, Calif. 94612.

Donald G. Ingraham
Senior Trial Deputy
District Attorney
Oakland, Calif.

SSN as Private Property

Although I agree with the need for storng privacy standards, I disagree with Steven Seltzer's letter and Computer*world*'s "Oops! We goofed" [CW, Aug. 8].

The rights of an individual to privacy are dramatically altered when his criminal acts destroy the rights of other members of society. The criminal was misusing the Social Security system. How else could CW alert possible victims to this misuse without publishing the "alias" Social Security numbers (SSN) the criminal used?

If the SSN is to be held in the same regard as private property (with respect to search and seizure), then let's require a court order for its use in criminal investigations, not ban it completely.

Abbott Fleur
New York, N.Y.

Computer*world* welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
Aug. 23, 1972

BOSTON — Virtual memory systems scored high marks in IBM 370/145 user tests. The Model 145 users who field-tested OS/VS1 found throughput equal to or better than what they were getting under OS/MFT, an IBM spokesman reported.

— — —

BOSTON — The founder of the Association for Computing Machinery (ACM) blasted the group for its failure to investigate whether computer applications are good or evil. The Special Interest Group on Computers and Society is "a sample of tokenism," Edmund C. Berkeley said at the association's 25th anniversary dinner here.

Eight Years Ago
Aug. 27, 1969

WASHINGTON, D.C. — The Court of Customs and Patent Appeals upheld the original decision made in the case of Prater and Wei that computer programs can be patented. But the decision did not uphold the claim for a patent on the software itself. The case involved patent claims made by Charles D. Prater and James Wei of Mobil Oil for a system of reducing errors in spectrographic analysis. The patent was originally rejected by the Patent Office on grounds it was a "mental process" and inherently unpatentable.

— — —

BOSTON — Separate pricing was the leading topic at the Share meeting held here. The question of whether members of the IBM users group would be willing to continue telling IBM what they needed if IBM turned around and sold the answers back was hotly debated. The undercurrent seemed to be in favor of splitting Share away from IBM and making it an independent users group, but there seemed to be an equally strong current toward continuing Share activities without change.

Where Are the Operations Success Stories?

By Jack Stone
Special to CW

The Human Connection

"And now will the *real* successful DP manager please stand up!"

This statement is not really intended to be a parody of a quote from a famous TV show. It is actually a serious request from this writer.

You see, I developed what I originally thought was a great idea for my next series of columns but, rather pathetically, it now appears doomed to failure. The concept of the sequence is that I visit a "successful" DP department and interview some of the people involved with the operation — a group consisting of, perhaps, a user manager, the senior non-DP executive, the DP manager, an operator, a systems programmer or whomever else might be interesting for the purposes intended.

The theory underlying the writing is, of course, that certain attributes of a successful installation may trigger ideas in the minds of readers that could help their own operations succeed.

My problem, ladies and gentlemen, is that I can't find a DP manager who is willing to stand up and claim a successful operation.

Now before you scoff and guffaw, let me talk more about the nature of my dilemma.

First, the categories of DP departments I've been looking at exclude those installations whose primary mission is not the processing of typical commercial-type production jobs, such as those devoted solely to development, since they are atypical.

Also excluded are scientific or engineering-oriented centers, since their users are generally (but not always) knowledgeable about their own needs, machine capabilities and systems design.

I did not include operations which are considered "small," in that the cost, DP head count, machine size or related factors are not of earth-shaking consequence to the organization. And, obviously, special-purpose machine systems are not considered.

I'm just referring to the typical DP department which is a separate entity, has its own staff of programmer/analysts and has its own machine operation with an IBM 370/145-class machine or larger. It processes a mixed bag of test and production jobs in the multiprocessing environment, has a reasonable level of cost/performance consciousness and services a host of non-DP-experienced users.

Now let me turn to a discussion of performance success. I accept the classic technical goals of efficiency, effectiveness and economy. But I believe there is another set of classic goals that must be met if technical performance is to be achieved. These are human performance goals.

Peering beneath the mechanistic cloak of "productivity" goals, I am referring to goals which pertain to human intellect, volition and affections. They include such notions as communications, motivation, loyalty, judgment, receptivity to change, energy, risk-taking, attitude, decision-making, analytical ability, leadership, integrity, purpose, desire for success and inspiration.

It may never make the textbooks, but I'll propose Jack Stone's Theorem on DP Management anyway. It states: "In general, the technical performance goals of the information systems function are achievable only when human performance goals are developed in humanistic terms and resources are applied toward their attainment."

I submit that my difficulty in finding a successful center strongly suggests the validity of my theorem because of the well-know disinterest in humanistic values, but does not constitute irrefutable proof.

As further testimony, let me relate just a few of the recent experiences I have had that illustrate rather elementary, yet devastating, applications (or lack of application) of the theorem:

- On user relations: During a lecture I gave to over 100 DP professionals, I asked, "How many of you believe the user's guide for your computer center properly or reasonably reflects the range of services, operating procedures and special guidelines for use of the center facilities?" Three hands.
- On management development: I purchased three new entries for my library of DP management textbooks. All three authors stated that human communications and interpersonal relations were very important but beyond the scope of their respective texts.
- On programmer/analyst managment: I met a person at NCC '77 who functions as a second-level programming/analyst manager and expressed interest in joining me for some writing projects. As we chatted, I concluded that I might finally have found my "successful" installation, since she revealed a great story of excellence in DP management. Sadly, though, I had to disqualify her installation as a candidate for my success story because it is heavily science-oriented. Much more distressing was that she could not refer me to any other prospect.
- On operations personnel: I received a frantic call from a prominent installation which was in the process of upgrading from a uniprocessor to a multiprocessor configuration. In spite of the untold number of dollars and man-hours involved in the conversion, it had neglected to plan for an effective

(Continued on Page 20)

Data Evacuation Can Save DP in Blackout

The Taylor Report

By Alan Taylor CDP

Blackouts like the one that hit New York City last month will hopefully never be so frequent that computer operators and analysts have to face them as daily occurrences. Because of their infrequency, they are treated as matters for contingency planning.

However, contingency plans often lack one important consideration — they take for granted that the world outside the computer room is operating normally. As the New York situation showed, however, there can be times when elevators don't run, the air conditioning stops and cars go only as far as their gas tanks will allow.

And yet, with increasing world complexity and increasing world shortages, it seems only prudent to see if DP operations can be safeguarded in an economic manner. This column suggests one possible method based upon the situation in New York, where the telephone communications systems continued running when the power went down.

The basic method is simply to evacuate the computer data via telephone and satellite to anywhere else in the world where preplanned, modified operations can continue to serve the area affected by the blackout. When the blackout is lifted, the process can be reversed.

The emergency mode in both the communications network and in the computer room would have to be initiated by some form of disaster signal. In the best form, such a signal could be an early warning signal, a sort of "Condition Yellow" sent out by the power company on a special network.

In other cases, when there is no time for a warning, the evacuation period could well have to be cut to five minutes, or even less.

The communications lines would have to verify the receipt and correctness of data at the remote site. This could not wait until the remote computer starts trying to operate on it; by then it might be too late to ask for part of a program to be retransmitted.

This appears to suggest the emergency communications network should be, at least in part, based upon packet switching so each packet of data being shot to safety would be checked for accuracy within a second of leaving the site and then maintained within the network in accurate form.

It would not appear to be necessary to send out all the data in the data center. The center would only have to send:

- Contingency alert instructions to

(Continued on Page 20)

Will Method Work?

This week's Taylor Report suggests a combination of power company and telephone company services could maintain essential DP operations by evacuating the data to a remote site during an emergency and then returning it later. Some of the essential points are listed here for your review.

1. Special telephone communications would carry warnings of power drops.
Would this work? Yes___ No___
Comment: ______________________________
____
Alternative: ______________________________
____

2. Special broadband equipment would be installed at the DP site to transmit files and programs during the contingency emergency.
Would this work? Yes___ No___
Comment: ______________________________
____
Alternative: ______________________________
____

3. The network would be a self-verifying one with data storage facilities and host computer connections to restart contingency programs, hopefully with switched phone numbers.
Would this work? Yes___ No___
Comment: ______________________________
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Reader Commentary

Safe Technology Needs Attention

By Donn B. Parker
Special to CW

As computers expand into sensitive functions in organizations throughout society, the need to assure safety from all kinds of dangers and losses in the use of computers becomes increasingly critical.

Concern over the threat of intentionally caused losses and abuses can be seen in recent articles in the Aug. 1 *Business Week* and Aug. 8 *Time* magazine, as well as in Sen. Abraham Ribicoff's Committee on Government Affairs in the U.S. Senate, which recently produced two reports on computer-related crime and is proposing criminal law on the subject [CW, July 4].

During the past seven years, I have had the unique privilege of working toward the goal of safer use of computers on a full-time basis as a consultant and researcher at SRI International, a not-for-profit research and problem-solving institute. SRI has strongly supported this work, and several private and federal clients, principally the National Science Foundation (NSF), have funded the efforts on a limited, often a no-fee or no-profit, basis.

Ethics and computer abuse are important subjects of this work at SRI. These two subjects are also of high interest in the public media.

Codes of Ethics

Codes of ethics have been of great benefit to society in other professions, including law, medicine, accounting and engineering. Critics of codes of ethics have an easy time of it. Their arguments are usually based on the logic that the exceptions, no matter how few, prove the codes' ineffectiveness.

Such "proof" is not hard to find because, in any profession with a code, each wrongdoing violates that code, and violations have great visibility.

On the other hand, little can be measured and very little is heard about the many positive results produced by codes of ethics. Through the good work of dedicated Association for Computing Machinery members, a code of ethics has been develolped, and a procedure for invoking sanctions is now being seriously considered. The Data Processing Management Association and other professional societies are also making headway in this area of responsibility.

About two years ago I reached the conclusion that a code of ethics, even with sanctions, would have little vitality unless the people concerned with computers were alert and sensitive to the ethical aspects of situations which arise and which they encounter in the course of their work. What was needed was a widespread interest and discussion within the computer field about specific ethical issues and about what is ethical and what is unethical.

A modest NSF grant was awarded to SRI to carry out a project on ethics in computer science and technology. That project is using an experimental methodology to make personal ethical issues amenable to explicit debate and opinion and ultimately to facilitate generalization in the expression of possible principles.

To accomplish this objective, 62 scenarios that raise ethical questions were presented for discussion at a national invitational workshop held in March. It was sponsored by American Federation of Information Processing Societies (Afips) and attended by people who were recommended by the presidents of the Afips constituent societies and persons known to have written on the subject of ethics. It included a range of people from the computer field, ethical philosophers and lawyers.

The final report on the project, to be published by the Afips Press, will consist primarily of the half-page scenarios, each followed by the votes of the participants on whether there were ethical violations, their opinions on the specific cases and a statement of any general principles that the scenarios might have suggested.

A recent article and request for reader response to two ethical scenarios in *Computerworld* [CW, March 21] indicate the great interest in and effectiveness of this scenarios technique. The reader responses were reported in the April 11 issue, and at that time over 350 respondents had submitted their opinions of the scenarios.

The importance of developing sensitivity, awareness, interest and dedication to ethics in the computer field can easily be seen from the results of the study of computer abuse that has been going on at SRI for almost seven years. It is funded primarily by grants from NSF at a two-person level of effort.

The study does not deal exclusively with fraud, theft, larceny, embezzlement, sabotage, espionage or extortion. It deals with all kinds of intentionally caused losses and abuses where they can be historically studied to produce information of value in helping potential victims protect themselves from similar experiences.

The file of reported cases represents a small, highly biased sample of loss experience; a number of the cases are reported only in the form of brief newspaper clippings. Many others are documented in great detail. The more valuable cases are being investigated in-depth and more information is being collected.

The needs for a safe technology require our attention. We should all be supporting the endeavors to meet those needs.

—Parker is senior management systems consultant at SRI Inernational in Menlo Park, Calif.

Evacuation Saves DP

(Continued from Page 19)

terminals.

- Minimum response, store and return programs to the emergency center.
- Minimum response files to the emergency center.

Preferably, the communications lines to the original data center would be switched to the emergency center when it is established (and that would be part of the communications operation). This is not too difficult using microcomputer systems for the switching operation — if the requirement has once been programmed in.

Naturally, all of this has to be financed somehow. There appear to be two means of financing it — one through private enterprise, the second through state control functions.

In the private enterprise operation, the telephone companies and perhaps the power company would offer it as a service; certain charges for equipment maintenance would be made when no blackout occurs and appropriate fees charged for services during blackouts.

The problem with this idea, however, is that communications companies and power companies are basically noncompetitive, so there is little incentive for them to offer such a service.

Under the state control functions, the provision of such computer evacuation and restart facilities would be mandated as a requirement of any communications facility in computer times.

So that is one system I see for averting big or little dangers to computerized operations from power failures. Doubtless there are errors here: perhaps other ideas would be better and more economical.

Here is a questionnaire for your suggestions on how to save computer operations from potential power disasters. You can use it for reviewing my ideas, but hopefully you will also use it to suggest your own solutions.

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Success Stories Sought

(Continued from Page 19)

operator training program and its operations function was in a wretched mess.

So here's my appeal. If you believe your installation is a success story and your category is proper, and you wish to tell the computer world about it via my series, send a letter of justification to me in the Editorial Department, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Try to keep the letter to under 500 words and include an OK to use your and your firm's names plus an invitation from a person in authority for my interviews (to be conducted at my own expense). Each entry will receive a complete set of my CW articles.

I really don't think I'll get one qualifying candidate. I truly believe Stone's Theorem is a universal DP truth as yet undiscovered by the world of DP management.

But 'Teams Don't Just Happen'

Team Programming Urged for Reliability

By Esther Surden
CW Staff

DALLAS — It is presently possible to implement a software system that has not been reviewed by anyone beside the programmer and "this is causing a lot of difficulties," according to Donald C. Gause, president of Ethnotech, Inc.

To remedy this situation, Gause recommended team programming techniques, which he said can provide improvements in reliability on the order of three times that of traditional programming.

To implement a team approach, a firm should know the talents available for the project. "Most of us don't really know who we have working for us," Gause told a recent conference here. "We wrongly estimate our people and there is no good yardstick to measure productivity."

In some cases, a person inadequate for the job is appointed chief programmer; in others, a person more adequate than the chief programmer is apointed backup for the chief, he said.

'Self-Organizing' Concept

In order to combat these problems, Gause suggested that users adopt a "self-organizing team concept" if roles are given. An open team in which no roles are assigned, however, will "encourage open inspection of work by team members," he said.

"Never let a problem become undefined," Gause urged. "Don't put effort into the management of unknown activities."

Many programmers don't know what is being built and there is no reliable measure of the percent of code that has been compiled. But something can be done about this situation if — before programming ever gets started — the team goes into the design phase with target dates, functional boundaries and formal reviews defined.

Using this procedure, the team can come closer to knowing what is to be done, he indicated.

"Teams don't just happen," Gause warned those thinking of trying the technique. Management has to invest in team building because a team that works well together can be productive and is in a good position to define its own difficulties, he said.

Users establishing a new team should try to create some experience-sharing opportunities on a social level to facilitate the rapport between members, he suggested. Successful teams should always be kept intact.

One problem faced by programmers trying a team approach is that management may not understand the concept. Management may see the team as not being on schedule for example, and try to add more people to the team.

This, however slows down the team because of the added burden of extra social interaction combined with heavier communications requirements, Gause stated.

Another problem is that sometimes one team member is burdened with too many roles, he said. Five members is the logical limitation of such an organization. This number allows diversity, but is small enough that the programmers will not splinter off into subgroups, he explained.

Adequate time also has to be allowed for learning, Gause said. Many feel that learning can be separated from performing the task, but with this attitude "we are missing the golden opportunity to provide a learning experience within the project itself," he cautioned.

The team can do something about reducing the unknowns in the programming effort, for example, by keeping a log of unknowns "by asking what you really don't know about the project." A top-down design strategy can also help, he said.

Accounting Modules Offered For Distributors on BSP 'Syfa'

IRVINE, Calif. — The Business Systems Applications Programs (BSAP) package recently introduced by Business Systems Products, Inc. (BSP) for use with its Advisor small business system is said to consist of nine fully integrated accounting modules for distributors.

The Advisor "really is the Computer Automation, Inc. Syfa system, with a different label," a BSP spokesman said.

The modules currently available under BSAP include basic file maintenance support, one- and two-step billing, order processing and credit/debit memo processing, he said.

Accounts receivable, inventory control, purchase order processing; sales analysis and end-of-day processing are also part of the package, he added.

The interactive on-line nature of the software sets it apart from the modules offered by some of BSP's competitors, the spokesman contended. He pointed to order point and credit limit warnings, issued as soon as a problem is sensed, as examples of BSAP's capabilities.

Each of the BSAP modules support all subsets and can be integrated with the other modules. The package can also be enhanced to complete the financial portions of manufacturing as well as other applications, the spokesman said.

The software, developed by Software Concepts, Inc. also of Irvine, and the Advisor hardware is suitable for small and medium-sized businesses with 10 to 500 employees and annual sales ranging from $500,000 to $50 million, BSP said.

The BSAP package is available for about $5,000, including 150 hours of training, the company said from 2121 Campus Drive, Irvine, Calif. 92715.

IBM Links Update 'Quikjob III'

DAYTON, Ohio — A variety of enhancements and a superset version of Quikjob III, a report writer system, are now available from System Support Software, Inc. (SSS).

The updates include optional interfaces with IBM's IMS and DL/I data base systems and full-function Vsam support for Quikjob work, the vendor said.

Meanwhile, Quikwrite, an information retrieval, processing and reporting system, now supports both Quikjob coding and a CALL facility to IMS, Cincom System's Total, Software AG's Adabas and other data base management systems, according to a spokesman.

The DOS-oriented QuikDLI interface was introduced earlier this year. The OS-based QuikIMS will be available Sept. 1. Either of these interfaces can be leased for $35/mo.

The Vsam support was made available to DOS users in March and April. Distribution of this facility will be made to OS-oriented Quikjob users this month and next. There is no extra charge for QuikVsam.

Report formats under Quikwrite are typically "autogenerated," but can be controlled by the user, he said. The system produces Quikjob III source code which can be stored and, if desired, refined to accomplish tasks not within the scope of a typical generalized report writer, he claimed.

The DOS version of Quikwrite is presently available; the OS version is expected to be available about Nov. 1. Current Quikjob III rental customers can acquire Quikwrite for $197/mo on a lease/purchase plan, the spokesman said from 5230 Springboro Pike, Dayton, Ohio 45439.

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College's Data Base Aids Gas, Oil Field Studies

By Esther Surden
CW Staff

DALLAS — With energy a national concern, the University of Oklahoma has developed a data base of petroleum-related information that is available to users over the General Electric time-sharing network, according to Patricia A. Tracy of the university.

The Petroleum Data System (PDS) consists of information on over 75,000 gas and oil fields in the U.S. and Canada.

Sources for the information include annual state reports, the International Oil Scouts Association and state geologists. In addition, information from the Federal Energy Administration, Federal Power Commission, Energy Research and Development Administration and the Bureau of the Mines is included in the data base.

The identification of a particular field by name and reservoir, location as well as production data and geologic information such as age of the formation is handled by the system, Tracy said here recently.

The system is used for exploration project evaluation studies, property evaluation studies, pipeline research and feasibility studies, she noted. "Oil companies use the data base to get the information necessary to complete government questionnaires," she added.

The university chose to use existing software systems to quickly implement the network-based data base. "The use of existing software has freed the university of many problems in program design and implementation" and also helped reduce implementation costs, she said.

"Using developed software has been a distinct advantage for us," she continued.

The packages chosen include a "sophisticated storage and retrieval system called Gipsy General Information Processing System developed at the University of Oklahoma. Gipsy is used on either an IBM 360 or 370 series and operates under OS. "It is an excellent system for management of large data bases," Tracy told the group.

The system is very flexible, she noted, and since the PDS must be continually updated, flexibility is key.

The school is also frequently restructuring files, she added.

For example, "we are currently adding the latitude and longitude of the centerpoints of the fields to the records in PDS," she said. All that has to be done is to add a new definition to the data dictionary, so no special reprogrammng is necessary, Tracy noted.

Gipsy has its own retrieval language that Tracy called a "user-oriented retrieval method."

Prior to the PDS being put on the GE network, the university tried to implement the system on its own in-house system. This was "somewhat of a farce because it didn't take much response from the industry to overwhelm the system," she related.

Now PDS resides on the GE remote-batch system. The university has developed an interface or foreground driver to allow simpler use of the system by those with wide varieties of expertise. Users range from geologists and engineers to secretaries and librarians, she said.

PDS is being used by 90 petroleum companies and several businesses and government agencies for a total of about 600 people on the system, she concluded.

Early Evaluation of Tools Seen Key to Software Plans

DALLAS — Early identification of an appropriate and complementary set of software engineering and project management procedures, controls and technologies is essential to good software project planning, according to speakers here recently.

Leon G. Stucki, systems development program manager at Boeing Computer Services, said the most important consideration when choosing a tool to improve productivity is payoff.

The organization should choose the system that has the biggest return on investment, Stucki told a group largely composed of project managers.

Users should remember they can not expect tools to be "commissioned today and up and running tomorrow. Early consideration of tools is very important," he said.

The organization should also "place tools in their proper perspective." There are "some elegant tools that are either too costly or require too much manual work to set them up," he cautioned.

Tools are also not free. "They do consume resources," and setting up the tools can be costly, demanding more resources than it is worth, he said.

The manager should "view the system in total perspective but, when planning, view it as a series of baselines and phases," according to Ray Caudill, team leader in the Air Force Data Automation Agency.

The development process is a continuum, he said, but it can only be handled when broken into pieces. "Why do software development efforts fail?" he asked. "Because we have not broken life cycles down into manageable, understandable entities."

Project Review

Review is another method of making sure projects succeed, Caudill said. "I've heard people say reviews are not worthwhile — that they are difficult to handle and manage. But from my point of view, the review is very important," he said.

At formal review time, users and DP people have a chance to change the project. This forces the users to think through the problem and also commits the DP people to say we know enough to go on to the next phase," he stated.

"Programming is unique in that it is one of the few tasks in which it's possible to work continuously but progress backwards," according to H. Sam Woodgate, manager of the public service section of Dataskil, a large British software house.

The firm is managing from 50 to 60 different jobs using system-generated data. The computer output is used as a management tool to help in planning, he indicated.

According to R. Dean Hartwick, manager of information systems operations at Logicon, Inc., the cost of doing a legitimate test effort is about 45% of the total cost. "Clearly test planning is a crucial part of the operation," he said.

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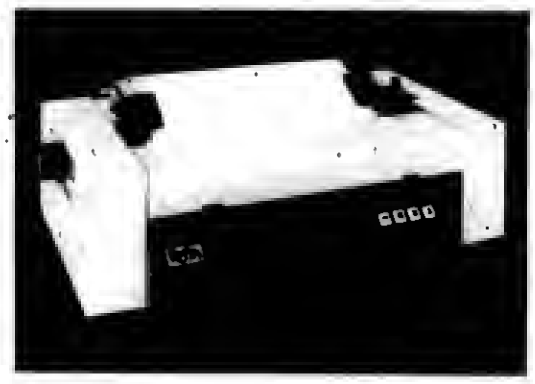

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Data Base Move Requires The Right Types of People

By Stephen Robinson
Special to CW

Data Base Corner

I have received several interesting responses to "Move to Data Base Requires Changes in Philosphy" [CW, June 6]. The tone of many of the letters was the same: "We know our systems are not making full use of hardware and softwarecapabilities. What do we do about it?

Some of the issues the letters raised are not directly related to data base details, but they are important. Like a careful consultant, I will not claim to have all the answers. I do, however, know some of the questions such as:

• **Planners or caretakers?** Somewhere in your organization is an individual or group of individuals who have primary responsibility for recommending upgrades/modifications/-discards of hardware.

Usually this group prepares a financial and technical recommendation for the ultimate decision makers, who control the purse strings.

Let's look at this group. Do they know what a minicomputer is? Would they recognize a microcomputer chip if someone slipped one in their lunchboxes? Or do they simply upgrade whatever computer line was present when they joined the compnay?

Put another way, is your computer center being looked after by kindly caretakers who wouldn't rock the boat if they could find a boat to rock? Or is it being managed by tough individuals supported by technical staff who know what is going on in the hardware area?

If you are in the former category, consider a transition to the latter. How you effect such a transition is clearly a function of you organization's structure and politics. A future column will contain a disguised case history of how one company managed the transition.

• **Business or computer analysts?** When your prospective "clients" talk to someone about their data and information requirements, do they talk to a business-oriented or a computer-oriented individual?

A client should first be able to talk with a business analyst who understands the environment that is creating the information requirement. The business analyst may be able to make significant contributions to the user's original concept of information requirements.

Once they have conceptualized the information requirements, the business analyst and the user get together with a computer analyst to discuss the proposed system and see how it can be implemented.

The computer analyst must personally be familiar with the state of the art in hardware and software or go to the meeting with technicians from the data center who have such knowledge.

Far too many systems are bungled at this stage. The computer analyst typically is constrained (actually, or in his own mind), by the existing hardware and software. Innovation goes out the window.

An application best done on a dedicated mini gets shoehorned into the existing maxi, where its low priority and resultant poor response destroys the value of the system. Alternatively, a system that would be a natural for a special-purpose programming language ends up being done in Cobol, which results in the commitment of 200% more programming, debugging and maintenance resources.

So there is a need for two different types of analysts. Make sure your computer analysts really understand the world of DP or move them out of that very responsible position. And don't promote someone into that job just because he is a good programmer, programming supervisor or program analyst.

• **Is management managing?** It is evident the biggest problem is people. Find people with the required expertise, interest in their professions, curiosity in new developments and pride in doing a good job. The responsibility for finding, and motivating such people must lie with management.

Hiring should not be based solely on how many years of Cobol programming a person has on his resume or what courses he took at college. Several years ago, when I was doing college recruiting for Applied Data Research (ADR), I would look for enthusiasm first. Was the interviewee putting himself, as well as me, to sleep with a description of recent programming projects?

Secondly, I would look for interest. At ADR we had an interactive programming language called ESI for the Digital Equipment Corp. PDP-8. The instructions were one page long. We gave a simple programming assignment and went away.

After an hour or so we checked back with the interviewee. We were interested not only in the solution to the problem, but how many features the interviewee used and/or played with.

Similar screening techniques — perhaps with different focusses — are, I suspect, widespread even if unpublicized. Personally, I'd welcome letters describing the way readers evaluate applicants beyond checking resumes. I'd be glad to share your thoughts in another column.

The other side of hiring, of course, if firing. The small number of people dismissed for incompetence is not nearly reflective of the sad state of DP activity throughout the country.

At a recent meeting of over 100 DP managers, I asked how many had fired people for incompetence within the last year. Two hands were raised.

I then remarked that everyone else must be really lucky to have excellent staffs who developed systems on time and within budget that were well documented and easily modifiable. The resultant laughter died down only when people realized they had nothing to laugh about.

The systems gap can only be bridged by people. Data base system development must be accompanied by the development and acquisition of competent business and computer analysts.

The onus is on management to recognize the importance of the requisite expertise and to acquire it.

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Architecture Based on X.25

NCR Unveils Distributed Network Plan

By John P. Hebert
CW Staff

DAYTON, Ohio — NCR Corp. has unveiled a standard-interface, packet-switched communications network architecture for distributed processing.

It was designed to consolidate and unify telecommunications architecture and protocols for all present and future NCR product lines, the company said.

The NCR Distributed Network Architecture (NCR/DNA) will be based on the CCITT X.25 protocol recommendation. It was described by Robert Galin, NCR's director of communications systems, as both an evolutionary outgrowth of existing NCR communications approaches and the addition of totally new concepts and equipment.

NCR/DNA will initially surface in products the company is planning to introduce late this year; the conversion of existing products to the unified approach should be completed in 1979, according to Galin.

The DNA approach allows any terminal in the remotely dispersed or in-house DNA network to access any user-authorized CPU and have data processed on it or to access any other authorized terminal in a network, Galin said.

It also separates communications processing tasks from applications processing, according to NCR.

The applications programmer is therefore insulated from the procedural aspects of communications, simplifying software and support for both realms, the company claimed.

Rather than centralizing control in a single host processor, DNA distributes control throughout the network, making it less vulnerable when a single network element malfunctions, NCR continued.

The DNA approach also makes possible the reconfiguration of networks to meet changing user needs without shutting down the network, it added.

Three Main Elements

The three main elements of the distributed architecture are Data Link Control, (DLC), the Telecommunications Access Method (TAM) and the Data Transporting Network (DTN).

NCR/DLC, based on the X.25 standard, is a bit-oriented protocol for telecommunications within DNA systems. All new NCR products will provide this protocol through added software modules called entry/exit service modules.

These modules will reconvert message header formats into the DNA network format and establish an end-to-end format, according to Galin.

NCR/DLC is similar to the American National Standards Institute's Advanced Data Communications Control Procedure (ADCCP) and the International Organization for Standardization's Higher Level Data Link Control (HDLC) protocols, NCR said.

As such, DNA will provide the means for establishing communications links from public data networks such as Datapac in Canada and Transpac in France, which are also based on X.25, NCR noted.

Networks operating under the DNA scheme will also provide users with a compatibility for non-NCR equipment that conforms to these protocols, as well as compatibility with equipment operaing in IBM Synchronous Data Link Control (SDLC), the company added.

NCR will make a commitment to be compatible, "but not necessarily" with IBM's System Network Architecture (SNA), Galin explained. "NCR plans to provide interfaces to appropriate non-NCR equipment, including host computers and terminals," he said.

NCR/DLC is described as operating on a message level, rather than a character level. It reportedly allows full-duplex operation between equipment in the DNA network and provides a high degree of error control.

In addition, DLC is the basis for a proprietary, high-speed (48 kbit/sec) modemless in-house communications technique "to which all future NCR systems will evolve." the company said.

NCR/DTN is a set of node processors and internodal links. It is the store-and-forward packet-switching system that serves user applications by moving information transparently, NCR explained.

These processes reside in terminals and communications processors connected to the

(Continued on Page 27)

With Hardware, Software

Raytheon PTS-100 Emulates SDLC

NORWOOD, Mass. — Raytheon Data Systems Co. has enhanced its PTS-100 series of programmable terminal systems to support communications under IBM's Synchronous Data Link Control (SDLC) protocol.

The enhancement permits PTS-100 systems to perform the functions of remote IBM 3270 equipment communicating with a host mainframe under SDLC, the company stated.

Central to the PTS-100 SDLC enhancement is a communications adapter built around an 8-bit microprocessor according to a spokesman. The communications adapter provides an interface between PTS-100 control units and modems with speeds ranging from 2,000- to 9,600 bit/sec, he said.

The software required to support SDLC communications from PTS-100 configurations resides in 4K words of MOS memory on the communications adapter board. As a result, the adapter can be reprogrammed as requirements change, Raytheon noted.

The adapter plugs into a low-speed multiplexer port in the terminal control unit, permitting currently installed PTS-100 systems to upgrade to SDLC capability.

System upgrades require only a tape cassette containing remote 3271 SDLC emulator software and the SDLC communications adapter, which replaces the existing BSC modem adapter.

There is no charge for the SDLC emulation software on new PTS-100 systems, Raytheon stated.

The cost of the SDLC communications adapter, required to upgrade existing installations, is $1,000.

Raytheon is at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Group Releases Glossary

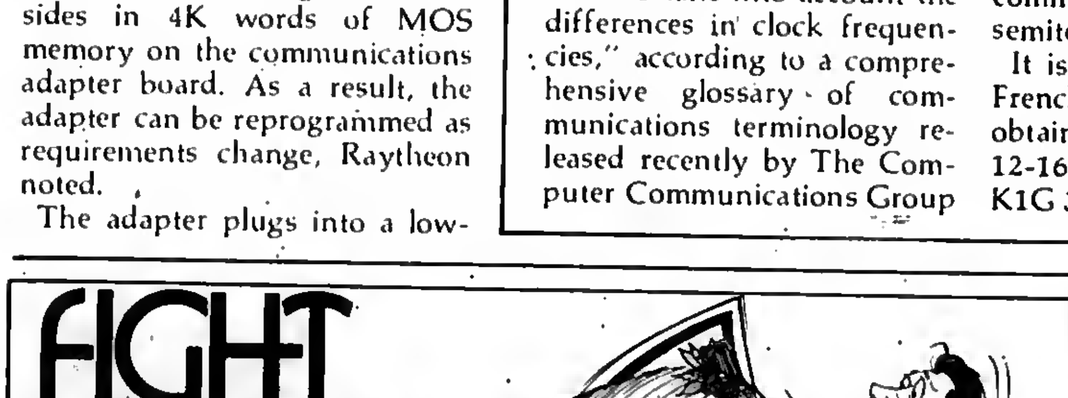
OTTAWA — Outside the world of computers and telecommunications, a "duplex" is a place to live and a "stuffing character" is a basketball star.

But in the communications field, a stuffing character is "a character used on multiplexed isochronous transmission links to take into account the differences in clock frequencies," according to a comprehensive glossary of communications terminology released recently by The Computer Communications Group of the Trans Canada Telephone System here.

Three years in the making, the glossary covers many of the new terms and acronyms that have evolved with the expanding field of computer communications, the group said.

The 32-page booklet defines commonly used terms at a semitechnical level.

It is available in English or French, costs $1 and can be obtained from the group at 12-160 Elgin St., Ottawa, Ont. K1G 3J4, Canada.



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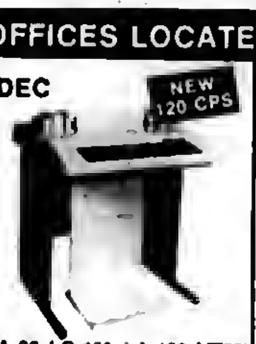

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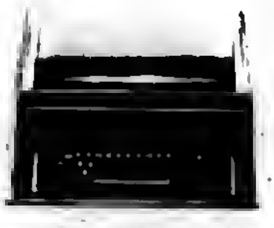

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Lear Siegler CRT Works In Burroughs Environment

ANAHEIM, Calif. – Lear Siegler, Inc. has introduced a dual-mode interactive CRT terminal said to be compatible with Burroughs Corp. CPUs and equipped for the Burroughs network polling environment.

The ADM-2B is switch-selectable for operation in two different modes. In one mode, the terminal functions as a standard ADM-2; in the other, it is a Burroughs Series TD800-compatible polling unit, a spokesman explained.

In the TD800 mode, the terminal reportedly adheres to standard Burroughs poll and address line protocols; has a forms mode for field protection; and offers text-editing features.

Switch-selectable line diagnostics for troubleshooting the data communications network and eight status displays set to provide the operator with error and status information are other features offered by the terminal, the spokesman noted.

Terminal Transactions

In addition, the ADM-2B will operate on the same lines with Burroughs TD800 and TD820 terminals, according to Lear Siegler.

Standard text-editing functions of the ADM-2B in both modes include erase to end of line/field/page; insert and delete character or line; blinking or blanking fields; cursor control; and addressing.

The terminal also features scrolling, tab set/reset, limited polling and full- and half-dulex transmission at 110- to 9,600 bit/sec, the spokesman added.

The terminal's CRT displays 24 lines of data at a density per line of 80 5 by 9 dot-matrix characters in a 7 by 11 dot-matrix field, he said.

The ADM-2B costs $2,485. An optional RS-232 interface costs an additional $50 from Lear Siegler at 714 N. Brookhurst St., Anaheim, Calif. 92803.

OCR SAVES MONEY

How Erie County, NY saves over $300,000 a year with OCR

It's a fact that most county government data processing departments have very tight budgets . . . and Erie County, NY is no exception. Gerald E. Wilson, Erie County's director of data processing recognizes that up to 30% of the cost of the average county government computer installation is in data entry. He initiated their use of OCR to cut those costs.

After careful evaluation they selected the Laser OCR-One optical character recognition system. Just one example of how Erie County cuts their data entry costs with the Laser OCR-One is their county nurses reporting system. This innovative new system alone saves at least $5,280 a week! An added bonus is more meaningful management reporting.

Despite a 15% staff reduction in their data processing department, Erie County has achieved a 16% increase in efficiency in 1975 and an additional 10% in 1976. Jerry Wilson says, "We really couldn't have gotten by without scanning and our Laser OCR-One."

For information on how you can cut data entry costs, contact

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ISC 8001 Gets Arabic and Farsi

NORCROSS, Ga. – Intelligent Systems Corp. (ISC) has developed a keyboard operating system in Arabic, Farsi and a number of other languages for its Intecolor 8001 eight-color alphanumeric/graphic terminal.

The operating system is said to change the shape of letters depending on their position in a word, allowing the operator to enter letters without regard to character forms.

In addition, when numerals or English alphabet characters are entered, they are automatically justified left so they can be read left to right, the company said.

The keyboard operating system increases the cost of an 8001 from about $2,400 to about $4,400. If a user wants Ascii characters for the terminal, it will "cost more than $5,000," while the Basic language compatibility costs less than $1,000, depending on the additional memory necessary, the spokesman said.

ISC is located at 5965 Peachtree Corners East, Norcross, Ga. 30071.

Series 100 Certified

COLUMBUS, Ohio – The MI² Corp. Series 100 TWX/DDD modem has been granted certification from the Federal Communications Commission in the Part 68 long-form registration procedure.

The registration allows users to connect the equipment to the switched telephone network; MI² has already produced and is presently shipping Series 100 modems.

MI² is at 1212 Kinnear Road, Columbus, Ohio 43212.

Bank Verifying Client Signatures on CRTs

DALLAS — A small bank here has reportedly become the first in the country to add a new wrinkle to banking — verification of customer signatures displayed on terminals located at teller stations.

Aside from the novelty of the approach to signature verification, the terminals perform a range of other functions and have saved Commonwealth National Bank enough money to justify the cost of five drive-in teller stations, according to Omar Dennis, the bank's senior vice-president and cashier.

Since early this year, Commonwealth National has been using the Signature Verification terminals supplied by Signature Technology, Inc. and made by Informer, Inc. to shorten waiting lines inside the bank and at drive-in windows.

Waiting time, especially at the drive-in teller stations, has been cut in half; the terminals also have helped to deter forgers, improve teller efficiency and productivity and preserve the goodwill of customers, Dennis said.

The terminals are tied to a Honeywell Information Systems, Inc. 2058 host CPU located 10 miles away at Affiliated Computer Systems, the bank's service bureau at 2,400 bit/sec over AT&T private lines.

Captured by Camera

Tellers can display information on customers' checking, savings and loan accounts as well as call up a digital display of the authorized signature for that account, Dennis said.

Signatures are captured at the same time a new account is established by a separate desktop, camera-equipped capture unit and stored in digitized form in the service bureau computer.

To capture a signature, a clerk positions the specimen on the capture unit, then depresses a capture key on the keyboard. If the display appearing on the terminal is satisfactory, the clerk then depresses the SEND key to transmit the signature to the computer for storage.

Commonwealth National, which processes an average of 17,000 checks daily, now has 15 Informer Model 301 Signature terminals — one at each of five drive-in stations, four shared by 10 internal tellers, plus one each in bookkeeping, general ledger, new accounts, credit inquiry/customer service and the loan department.

Operations and administrative officers have executive inquiry models to inspect any of the bank's 21,000 accounts.

'Cusomers Fascinated'

"Our customers have been fascinated," Dennis said. "They say they feel a little more secure against someone forging a check on their account, but the real benefit is good will anytime the customer comes to the bank.

"This is especially true at the drive-in stations. The teller doesn't have to ask for further identification or interrogate the customer," he siad.

"Previously, we used the direct card system for signature verification," Dennis recalled. "Tellers inside the bank had to walk over to a central file and look up the customer's card. In the drive-in stations, tellers had to phone inside the bank. If there was any question, they had to send the customer inside.

"Bank employees love it, too," he added. "With the old card system, they had to leave their cage and leave their customer waiting while they verified a signature or looked up a balance.

"Now, they either have a terminal right next to them, or some may have to cross over four or five feet to a shared terminal."

The Signature terminal's small size and relatively inexpensive cost has prompted Commonwealth to install CRTs without the signature feature in other departments of the bank, such as the loan department. The terminal has a full keyboard with a pedestal-mounted 6-in. CRT.

Commonwealth National chose the Informer Signature terminal after carefully evaluating microfiche and closed-circuit TV, according to Dennis.

"We were looking for something that was compact. Microfiche has to be updated, changed and added to periodically. With closed-circuit TV, we would have needed an extra person just to man the station," he noted.

"In comparison, we felt that with the amount of money we would have had to invest in microfiche or, TV plus the extra people to operate them, vs. the amount of investment in the Signature system, we are financially better off with the 15 Signature units.

"What we saved by going with the Signature terminal system has justified the cost on five drive-in teller stations alone," Dennis said. "The Signature terminal is basically just a different type of CRT that happens to be lighter in weight, less bulky and takes up less space in the teller's cage where space is at a premium."

NCR Unveils Net Scheme

(Continued from Page 25)

network and address each other by English language names, without regard to physical location.

Each processor node — whether it be a separate piece of hardware or software "buried" in a small CPU in the network — will have user-programmable conversion tables, Galin said.

The conversion tables will convert the English address consisting of a 12-byte field to a physical location address of 15 to 23 bits and then transmit to the next node. Each node will in turn determine whether the information packet is for it or for another node further down the line, Galin explained.

NCR/TAM functions as a boundary between applications object programs and the telecommunications devices, the company stated.

Other functions of the access method include system and link control, queue management, resource scheduling, addition/deletion of packet headers, error recovery and reporting and operational diagnostics, it said.

NCR/TAM will have no relation to IBM's Telecommunications Access Method (Tcam) except for the operating system and access methods. There will, in essence, be no compatibility with IBM's version, Galin claimed.

The DNA network was designed to use dedicated lines presently provided by communications common carriers, although NCR will offer users the option of employing dial-up lines as backup, according to Galin.

NCR will announce the first communications processor designed under DNA guidelines, the NCR 721, next month. The first DNA terminal will be introduced by the end of the year, and there will be a string of products announcements in the first half of 1978.

'Pushes More Data'

The DNA protocol scheme, like its international counterparts, makes more efficient use of communications lines — "pushes more data through the same size pipe" — because of the elimination of conversion overhead and the use of simultaneous, two-way communications, Galin remarked.

If present users want the capabilities of the distributed architecture, they will have to weigh the cost of conversion against the operating cost benefits of such a system, he added, indicating the cost of conversion could be very high.

"There will be restrictions both on the number of CPUs in a network, as well as how many can communicate simultaneously, Galin admitted, adding those limits will be divulged in the first half of next year.

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To Lease or to Purchase?

User Changes Upgrade Query Approach

DENVER — Data Power, Inc. has upgraded its DP capabilities four times in the past four years. But when the service bureau made its latest change last December, it decided to buy its own mainframe instead of continuing to lease.

"Our growth has stabilized at about 10% a year and, at that rate, we feel our system will serve our needs for at least another eight years, and perhaps more," Russ Lowery, Data Power president, explained. That stability in growth is what made Data Power confident enough to purchase instead of lease, he said.

"With so much power and the built-in provision for expansion, the obvious economies of outright purchase over leasing became paramount. This was especially true because of the equity we had built up in peripherals such as our disk drives," Lowery noted.

"Furthermore, since we had been an NCR user since the day we replaced our punched card equipment with a disk-oriented computer, there was no conversion problem," he added.

The company which is now Data Power had its genesis as the DP department of Cummins Power, Inc., the diesel engine distributor. Cummins' first NCR computer was a 16K Century 100, which was installed in 1969. That was replaced with a 32K Century 200 when Data Power was established as a separate entity in 1973.

This card reader was the only peripheral Data Power bought when it made its latest upgrade.

A year later, co-ownership in the service bureau was acquired by Colorado Kenworth, Inc., and Data Power added a 32K-byte Century 101.

The additional processing capacity was needed because Colorado Kenworth sells and services over-the-road tractor rigs and generates about 5,000 invoices a month.

Steady growth in the demand for DP led to Data Power's decision in early 1976 to replace its Century 200 and 101 systems with a 128K Century 151. A major benefit was the system's multiprogramming capability, Lowery noted; three programs could be run simultaneously instead of the previous two.

The need for enhanced flexibility became urgent as the service bureau expanded its roster of customers. Data Power saw its Century 151 would not be adequate, in part because the two owners were becoming interested in on-line access to their data bases.

So instead of expanding the Century 151 CPU to its maximum of 256K bytes, the service bureau bought a 256K-byte Criterion 8550.

The price was nearly the same as the cost to boost the CPU of the 151, Lowery said, and there were several advantages. Among them is the fact that the Criterion CPU can be expanded to 1M byte in increments of 64K and the fact that the internal memory is twice as fast as that of the 151, he pointed out.

"With respect to the speed," Lowery said, "the critical consideration is that there will be no degradation of response time with on-line processing. In addition, whenever it may become desirable, the internal speed of the Criterion can be nearly doubled with an adjustment which takes only 10 minutes or so to perform on-site.

"Another advantage with the Criterion is its virtual memory, which permits data to be moved back and forth between the CPU and disk storage at high speed, enabling us to run more jobs simultaneously."

Series of Micros

The central processor of the Criterion is actually a series of microprocessors which are linked by a transfer bus like those found in many minicomputers. Through the use of floppy disk firmware, the CPU can emulate virtually any other computer, a CDC spokesman explained. It can therefore run Data Power's Century programs with no conversion required, or it can function as a Cobol virtual machine and can compile Fortran, RPG and Basic, he said.

The only peripheral added to Data Power's Criterion system, aside from the CRT operating console and its thermal printing I/O writer, was a 600 card/min reader.

The company retained its 1,200 line/min printer, its 800- and 1,600 bit/in. tape drive

(Continued on Page 30)

Planning Can Minimize Effect Of All Types of Catastrophes

By Jack S. Barritt
Special to CW

As firms become increasingly dependent upon having DP capabilities, there are two important questions that management must ask itself.

The first is, "What are the short- and long-term effects on operations if our existing DP capabilities are lost?"

Secondly, management must ask, "What can we do beforehand to reduce the overall impact of such a loss?"

The answer to the first question needs to be thorough and detailed. Each plant department or organizational unit that uses the computers should be required to outline what effect, if any, there would be on its operations if the computers become unavailable without prior notice for one day, one week or one month.

Also, they must determine what substitutes, if any, can be employed during these times and what would be required in terms of manpower, equipment and facilities.

As these replies are analyzed, it should become apparent how heavily computer activity impacts the overall operations of a firm. The analysis will also determine the time frame in which recovery must be made if serious disruptions are to be avoided.

A critical condition will exist when the effects are obviously immediate, serious and with no economically practical substitutes.

Serious fires in early computer installations focused attention on the need for specialized protection for this valuable and highly sensitive occupancy. After initial action by some of the larger insurance organizations, the National Fire Protection Association (NFPA) formed a special technical group in January 1960 known as the Committee on Electronic Computer Systems.

In 1962 the first edition of the Standard for the Protection of Electronic Computer/-Equipment — NFPA No. 75 — was adopted. Revisions were subsequently adopted in 1963, 1964, 1968, 1975 and 1976.

As a result, combustible construction is usually avoided and the computer facility is isolated from exposing occupancies. Smoke detectors are installed for early warning of impending trouble. Automatic sprinklers and/or Halon 1301 total-flooding systems are provided for fires that cannot be quickly controlled by or exceed the capability of portable extinguishers.

But natural or man-made disasters still occur and will continue to do so, although hopefully at a reduced frequency. For example:

- In New York, as a result of storm Agnes, a corporate computer facility serving a number of outside plant locations was destroyed by flood at the same time that the main telephone cable for the community was lost.
- In Georgia, a tornado knocked out the computer facility for a large manufacturing and warehousing complex.
- A $700,000 insured loss occurred in California when a high-pressure water main ruptured beneath a one-story building housing the computer system controlling the receiving, sales and warehousing operations of a large distribution firm.
- In Massachusetts, a fire that originated two floors below a computer center spread vertically through a cable shaft and virtually

(Continued on Page 30)

Seminar on Management Set

DELRAN, N.J. — Datapro Research Corp. is offering "Effective Computer Operations Management," a DP technology seminar for managers, supervisors and key computer center personnel.

The three-day seminar will be held in Chicago on Oct. 12-14 and Dec. 7-9, in New York on Oct. 3-5 and Nov. 2-4, in Philadelphia on Oct. 24-26 and in San Francisco on Sept.12-14 and Dec. 12-14. It will also be held in Washington, D.C, on Sept. 19-21 and Nov. 9-11.

The seminar is designed to discuss the controls, techniques and procedures of effective computer operations management, offering discussion in implementation, problems, successes and failures, a spokesman noted.

The seminar costs $425 for current Datapro subscribers and $475 for nonsubscribers. A brochure with the complete course outline is available from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Preplanning Minimizes Impact of Disasters

(Continued from Page 29)

destroyed the center through the actions of heat, soot and corrosive gases.

- A number of militant groups across the country have used gasoline fire bombs or explosives to damage targeted computer facilities.

The most straightforward means for reducing any unacceptable impact is duplication at another site. However, complete duplication is normally not feasible because of the capital investment and operating overhead required.

Nevertheless, a significant reduction in overall dependency may be achieved by putting minicomputers at the point of use and terminating or restricting the use of the main computers for less complex or secondary programs.

Another and more commonly used alternative is the use of some other facility on an emergency basis. The success of this approach depends upon a number of factors:

- The requirement that the operations be batch-typed and not real-time (i.e., dependent upon an external telecommunications network).
- The proving by actual use that the substitute computer system's capability and configuration are compatible with existing programs.
- The existence of a firm, written agreement detailing the minimum amount of computer time available in an emergency, how soon it is available after initial request and for how long a time span.
- The prior establishment of priorities for handling various programs on a potentially restricted computer time base.

The final solution involves re-creation of the facility at the same or a substitute site. This approach is often dictated for on-line or real-time applications that receive and transmit data over external telecommunication connections.

Computers servicing multiple locations, such as for airline reservations or for directly controlling processes as in a chemical plant or paper mill, are examples of such applications. Success in this approach hinges upon:

- Availability of needed computer equipment on short notice.
- Availability of office space that can readily be converted for controlled computer environment.
- Efficiency in reestablishing telecommunications circuits.
- The ability to update data bases from the time of initial interruption.

Examples can be found where there have been miraculous recoveries as the result of herculean efforts on the part of many people, including the user and the equipment manufacturer. The key in most cases was a degree of disaster preplanning coupled with well-defined levels of authority.

This combination lends itself to efficient use of resources, coordinated efforts and timely decisions.

Accordingly, along with prevention, protection, prediction and preplanning, the final "P" in the successful disaster recovery effort has to be people.

Key personnel must be selected beforehand and given clearly defined assignments of responsibility along with commensurate authority. The best laid plans are all for naught until someone takes charge and motivates, inspires, coordinates and directs other people.

So, plan well — but make sure that the plans will be activated and followed in the manner intended by choosing your disaster team just as wisely.

Barritt is the chief research engineer for Industrial Risk Insurers of Hartford, Conn.

User Switches Upgrade Method

(Continued from Page 29)

and its six dual-density disk drawers, each capable of putting 48 million characters of information on-line.

"We could have gone to the 100 million character disk units," Lowery noted, "but we had a substantial lease equity in the old ones, and we need the six separate drawers to run different customer jobs simultaneously."

Each of the company's principal owners, Cummins and Colorado Kenworth, has three CRT terminals in its headquarters. This number will probably increase to 20 at each company when their branches are linked on-line to the Denver DP center, Lowery said.

With this step, he continued, all invoice billing and repair order processing will be input through the CRT keyboards. This data is now being keypunched in batch mode from time cards and handwritten records.

The service departments of the two major users receive a preinvoice audit which details the charges for parts and labor on each job.

"This is important because it permits them to review the proposed charges before customers see their bills," Lowery said. "When you have to operate in a warranty environment as such companies do today, you can avoid unnecessary customer complaints by making the appropriate bill adjustments ahead of time. In addition, of course, such a step helps ensure accuracy."

The rationale for the creation of Data Power, Lowery continued, was to provide Cummins Power with the expanded DP capacity it needed, yet amortize the cost for that among others who could use the computer center when it would otherwise be idle.

Finally. A full-power
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Or an operat

We call it the CalComp IGT-100.

It's an acronym with the emphasis on action. Short for Interactive Graphics Terminal. A unique, new CalComp graphics tool that effectively combines built-in intelligence with advanced refresh technology.

The first in a new family of Interactive Graphic products from CalComp. All specifically designed to make things easier for both the host computer and the terminal operator.

For starters, we made the IGT-100 interactive. And truly intelligent. So it's fully capable of sharing the graphics workload with its host computer.

Then, we gave it a longer-lasting raster scan (TV) type display. To produce faster, brighter, flicker-free images. To give you sharper, black-and-white graphics. And to totally eliminate time-consuming image redrawing.

By contrast, most graphics terminals in the field today (with storage tubes) are about as far from interactive and intelligent as you can get.

Dependent is more like it. Because, typically, every graphic image — and every graphic manipulation — has to be carefully calculated, then transmitted, by the host computer to the waiting graphics terminal.

This whole routine not only puts a tremendous burden on the host computer (which usually has other jobs to do) but routinely requires lots of special software.

With storage tube type terminals, even routine manipulations like panning, zooming, selective erasing and message changing aren't very fast. In fact, the terminal operator is required to wait — up to several minutes — for a previous image to be completely erased and the second image to be tediously redrawn.

You get the picture, all right. But you'll get it faster with the new CalComp IGT-100. Because the IGT-100 is the quickest solution to these traditional problems. And easily, one of the most affordable.

Thanks to our built-in microprocessor, efficiency doesn't get lost in the shuffle.

A built-in microprocessor helps make the new IGT-100 one of the smartest graphics terminals you can buy. And one of the most efficient.

Coupled with 12K bytes of RAM memory, the IGT-100's microprocessor permits local storage, manipulation and completion of display functions. While providing an addressable memory matrix of 1024 X 680 bit positions. And a viewable matrix of 416 X 312 positions.

A keyboard with a 64 character ASCII set and an asynchronous RS-232-C interface are also supported by the IGT-100's microprocessor. Full or half duplex modes are switch-selectable. Along with asynchronous communication transmission rates from 300 to 9600 baud.

Give your new IGT-100 the whole picture and you'll never redraw it again.

Unlike most other graphics terminals, the new IGT-100 can store and manipulate images on a totally local level.

That means once an image is transmitted, you've got complete, autonomous control. All planning, selective erasing and message changing is instantaneously handled by the IGT-100's built-in microprocessor.

Even write-thru's, grids and zooms (2x, 4x, 6x and 8x) are displayed on the screen within 1/10th of a second.

And all without tying up your host computer. Or waiting several minutes for the image to be redrawn on a storage tube.

In fact, working with its built-in microprocessor, the IGT-100's longer-lasting raster scan screen will beat a conventional storage tube every time. Delivering a faster, brighter image at a flicker-free rate of 60 frames per second.

And that's a mighty pretty picture — any way you look at it.

Reader/Punch Links to LA36

WELLESLEY HILLS, Mass. – The National Computer Communications Co. has introduced a paper tape reader/punch that reportedly interfaces with the Digital Equipment Corp. LA36 and LS-120 terminals.

It will also link to any other terminal that uses an RS-232 interface supporting standard automatic send/receive (ASR) requirements, a spokesman added.

The Mode 1050 reads and punches at 30 char./sec and can optionally convert Ascii to EIA code.

The unit costs $2,295 from the firm at 171 Worchester St., Wellesley Hills, Mass. 02181.

For Varian 4000 Series

Interface Converts Vector Data to Raster

PALO ALTO, Calif. – Varian Graphics has a microprocessor controller interface that reportedly reduces the computing power needed to produce graphic output on electrostatic printer/plotters.

Graphware I is a 5 mHz control store processor that uses digital techniques to generate raster data from vector data, a spokesman explained.

Accepts Sorted Vectors

The interface I accepts sorted vectors as input and generates raster data for output to the firm's Statos electrostatic printer/plotter. It allows the particular application program to pass sorted file information from the host processor directly to the interface without requiring additional computing to be performed on the vectors, he claimed.

Graphware I was designed to operate with any of Varian's 4000 series printer/plotters. It is supplied in a rack-mounted or stand-alone configuration.

The unit costs $4,850 and comes with 1K byte of memory, which provides for 160 current vectors. It can be configured with up to 32K bytes, the spokesman noted from 611 Hansen Way, Palo Alto, Calif. 94303.

Free Pamphlets Available

Six firms are offering to readers free brochures or pamphlets describing their products and services.

The Computer Products Division of Electronic Memories and Magnetics Corp. (EMM) is offering an application note describing an insurance company's selection process and benefits of add-on memory for the IBM 370/155. "User Notes No. 1" can be obtained by writing to EMM at 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

A four-page brochure describing the System 200 Record Processor by A.B. Dick/Scott is available from the company at Alvord St., South Hadley, Mass. 01075.

Tandem Products

A 12-page brochure explaining the hardware and software organization of Tandem Computers, Inc. systems is available from the firm at 20605 Valley Green Drive, Cupertino, Calif. 95014.

A magnetic media maintenance equipment buyers catalog is available from Richard Hurley at Kybe Corp., 132 Calvary St., Waltham, Mass. 02154.

Applied Color Systems, Inc. has a bulletin describing its Spectra-Sensor continuous curve plotter. The bulletin can be obtained by writing to the firm at P.O. Box 5800, Princeton Service Center, U.S. Highway No. 1, Princeton, N.J. 08540.

Guildon Industries, Inc.'s AP-20 thermal printer is described in a four-page catalog the firm is offering from its Measurement & Control Systems Division, East Greenwich, R.I. 02818.

Correction

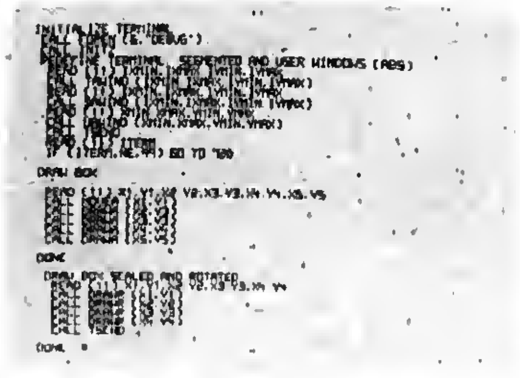
The first two parts of the "Merged Technologies" series [CW, July 25, Aug. 1] were coauthored by Frank Malabarba, a computer specialist with the U.S. Navy at Indian Head, Md.

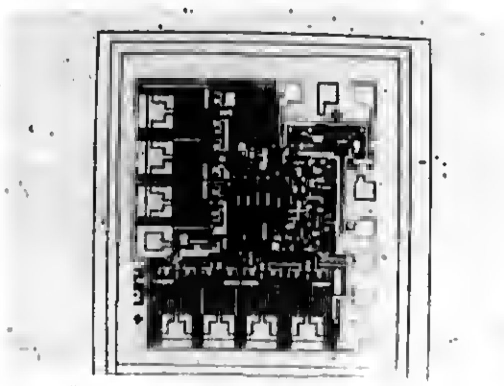
ed graphics terminal
computer's power.
or's patience.

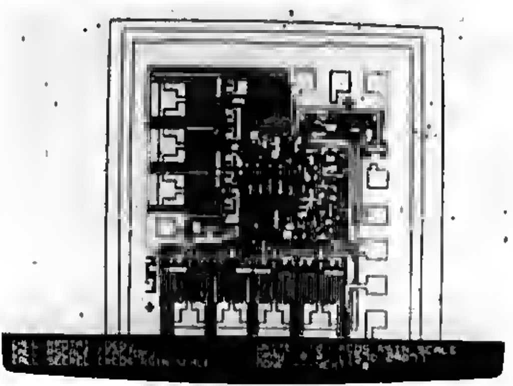
Six images that warrant some serious comparison shopping.
A quick look at basic viewing capabilities and you'll soon discover there's not a more versatile graphics terminal around than the CalComp IGT-100.

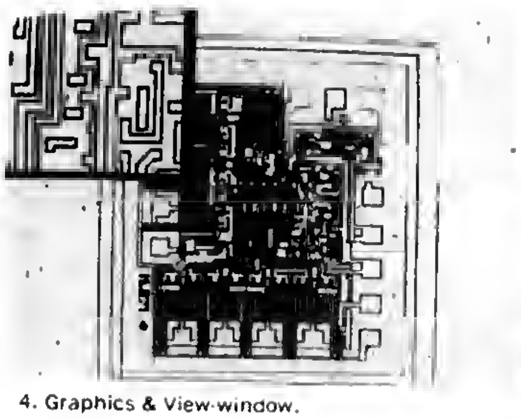
100's introductory price is super-competitive. Especially compared to storage tube devices. (And there's an equally attractive leasing plan, too.)

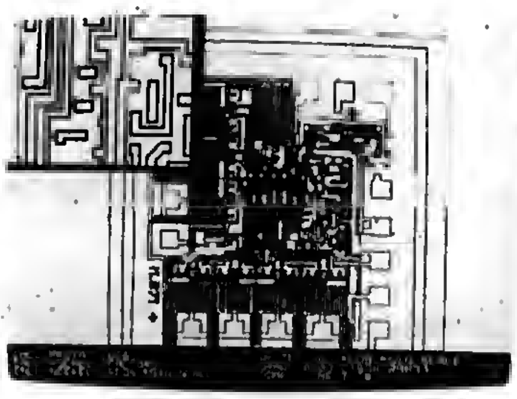
But we didn't stop with just a great terminal at a great price. We added an entire year's worth of

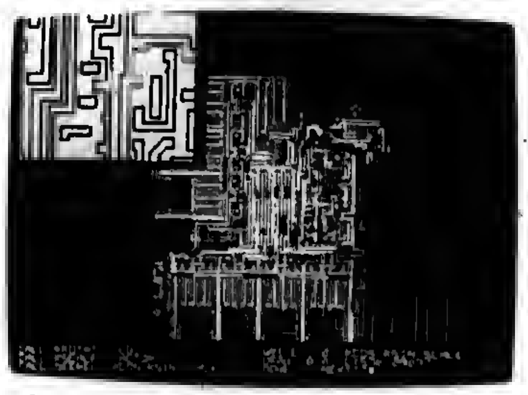

1. All alpha-numerics.


2. All graphics.


3. Alpha-numerics & graphics.


4. Graphics & View-window.


5. Alpha-numerics, graphics & View-window.


6. Alpha-numerics, Graphics & View-window (with reversed-out section).

To begin with, the IGT-100's special three-way, split-screen design provides you with separate alphanumeric, graphics and view-window sections.

Plus the ability to independently view and control (i.e. panning, zooming, etc.) one or a combination of these sections simultaneously.

Images can even be reversed (white on black) in the graphics and view-window sections.

The IGT-100's basic screen design maximizes the amount of data that can be displayed while providing you with six basic screen arrangements. Annoying superimposed messages have been totally eliminated.

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service — labor, parts, everything — to the deal. Right along with the finest graphics terminal support software. (It's even compatible with standard CalComp plotting software and Plot 10.)

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Citibank Minis Survive Blackout Easily

By Esther Surden
CW Staff

NEW YORK – What happened when last month's blackout hit Citibank's myriad of minis?

The systems performed admirably, according to spokesmen for the bank, which has a well-publicized policy of decentralization with small systems.

In fact, the minicomputers came through the blackout unscathed, prompting one vice-president to remark that his operation would have been really damaged if it was still running on a large batch-oriented mainframe.

"During the blackout, I only had two machines with auxiliary power," Gary Geresi said. The vice-president of services management for securities systems noted "the rest were on floors that did not have the auxiliary power."

Geresi is in charge of 25 Interdata Inc., minicomputers that perform a securities processing application.

"When the blackout hit, we powered down the minis" to prevent surges, he explained. Staff was kept on duty around the clock to be available to test for file integrity as soon as power returned.

Testing for power integrity was also performed during the blackout on the two operating minis. When the power was finally restored, the file integrity tests were completed and "we then ran Wednesday night's work.

"We were absolutely satisfied with the performance of the minis and no data was lost," Geresis said. "By mid-morning Friday, we were up-to-date."

Nothing much happened to the six Digital Equipment Corp. PDP-11/70s in the National Banking Group either, according to Nicholas Papanikolaw, vice-president of services management for that area.

The bank has its own telephone system that is powered by Consolidated Edison power and has limited battery backup. But the bank does keep Bell Ssytem phones in strategic places for emergencies, and that is how Papanikolaw was alerted.

"The first thing I did was secure the building" to make sure that those working in it were all right, Papanikowlaw said. Then he proceeded to "power down all the minis" by pulling the main fuse. The DEC equipment was located on the sixth and 12th floors.

When power was restored, one system at a time was brought up. Only one of the PDP-11/70s sustained any damage, and that was the only system that was not processing at the time of the blackout, he said.

The memory board that was damaged was replaced easily and no head crashes or other major hardware problems occurred, he added.

Another vice-president in charge of several minicomputers, including three DEC PDP-11/70s and six Qantel systems, had a similar story to tell.

"The way we process, all of the minicomputers were shut down [when the blackout hit] except for the 11/70 on which we process our 'lock box' nightly updates, according to Jack Egan, vice-president, services management, World Corporation Group.

"The minis were not affected. The one 11/70 went down, but at the time it went down 90% of the work had already been processed.

The 10% of the checks yet to be processed were handled manually, he explained, and "we walked them over" to the Federal Reserve Bank.

Searcher Discovers Flexibility

By Esther Surden
CW Staff

Computer file of judgments and liens is updated daily at Law Bulletin Title Services.

CHICAGO – A switch from an IBM System 3/10 to a Univac 90/30 brought Law Bulletin Title Services here more processing power for its money while increasing its flexibility, according to George E. Chismark Jr., treasurer.

The firm runs a service for realtors, attorneys, bankers and title companies that provides judgment and lien searches for transfers of real estate.

Its parent company, the Law Bulletin Publishing Co., publishes the *Chicago Daily Law Bulletin* as well as a number of other newspapers, magazines and books.

Entering the title search field meant the company had to expand its DP capability. It developed its first DP operation in 1968 with the installation of IBM unit record punched card tabulating equipment to handle accounts receivable.

In 1971, a small card-oriented system 3/10 was installed to process other applications and general accounting. In 1974, a conversion was made to a disk-oriented 3/10 to accommodate subscription fulfillment services as well as enhance other applications.

Then, in 1976, the company began its search for a more powerful system.

"We were satisfied with our vendor and the product provided, so initially we looked to our own 'supplier,'' Chismark said." We ordered a 3/12 until we found out it could not do some things IBM promised it could do."

The company then looked at Burroughs, Univac and Honeywell equipment and had "investigative conversations" with each of the vendors.

"My DP manager had previous experience with Univac" and since that firm, like IBM, was located "right across the street," the switch in vendors was likely to make no difference in service, Chismark stated.

The most important reason for choosing the Univac system, however, was its flexibility and growth capability, he said. "This system can grow to a quarter of a million bytes of memory" and can accommodate 32 disk drives without changing hardware.

"With IBM and the other manufacturers, you have to change hardware," he noted, and with IBM that change included a conversion.

Configured with a main memory of 48K bytes, two disk drives with 58.9 Mbytes of storage capacity each, a 500 line/min printer and a 500 card/

(Continued on Page 36)

In Security Trading Application

User Picks Mini Over Mainframe

PHILADELPHIA – An end-user department at Philadelphia National Bank (PNB) here is using a small business system to supplement its mainframes for its security trading application.

"When we decided to automate the Bank Investment Division at PNB, we discussed using the large central system, but decided against it for several reasons," Kenneth H. States, administrative officer, said.

First, the department was concerned about getting the information it needed when it needed it – "especially if a question of priorities arose."

It also wanted independence of operations from the large system so if anything went wrong with the mainframe computer, the department would still be able to function. The bank's central DP department has one IBM 370/168 and one 370/158.

Further, the software programs the Bank Investment Division wanted required a highly specialized background, States recalled.

After a year of investigating the various business systems available, installation of a Basic/Four Corp. Model 400 was recommended by READQ Systems, Inc., a New York firm that specializes in software for financial applications.

"What was of particular interest to us was the fact that we could get the software programs we wanted," States said. "READQ had the experience we were looking for, and the Basic/Four system was suited for the applications we had in mind."

The Bank Investment Division uses the computer for a broad range of transactions that involve the preparation of buy/sell confirmations for all money market instruments, municipal bonds and government obligations. It also handles dealer, trading and portfolio/escrow/collateral position accounting.

All types of special reports are generated. For example, trade date reports and settlement date reports are issued each day. Since a trade will be initiated on one day but the settlement doesn't occur until several days later, this has proved to be a much more reliable way than the previous "pen and ink" method to keep track of these activities, States

(Continued on Page 34)

Switch From 1130 to Mini Eases DP Overload

By Ann Dooley
CW Staff

DEARBORN, Mich. — Peninsular Diesel, Inc. switched from an IBM 1130 to a Burroughs B1700 system because the company's rapid growth created the need for more core, disk capacity and total processing capability, according to George Mrla, assistant DP manager.

The system handles all the company's general accounting operations including payroll for about 300 employees as well as accounts payable and receivable, financial statements and general ledger, according to Gladys Moryc, DP manager.

Peninsular Diesel, a distributor for the Detroit Diesel Allison Division of General Motors Corp., has grown from one small outlet with three employees to a network of 63 franchised dealers in the lower peninsula of the state.

The headquarters coordinates sales, service, parts, engineering and administrative offices.

The old system wasn't able to meet the growing demands that were being put on it, Mrla said, so "we looked at everything that was out at the time and decided to go to Burroughs."

With the Burroughs mini system, DP operations could be cut to a single shift; now five programs can be processed at a time instead of the previous one, he said.

All of the staff was retained and absorbed so there was no problem there, Mrla continued.

When the system was first installed, the DP staff used Burroughs packages, but now "we do all our own," according to Mrla.

The system includes a 64K memory, 1M-byte disk storage, a 300 line/min printer, 600 card/min reader, a card punch, keypunchers and two disk packs, Mrla said. It is valued at $100,000, according to Moryc.

Accounting information is input via Teletype and punched onto cards. The cards are then run through the minicomputer, which produces an invoice.

The invoice will be mailed to the customer or filed depending on the information and its use, Mrla said.

Other applications include inventory control for more than 18,000 new and rebuilt parts and forecasting and pricing, Moryc said. The Teletypes are used in dealer and branch facilities.

There was no problem in switching from one system to another, Mrla said. "We were operating both systems for a year before we went entirely over," he said, adding parallel operation is "the only way to fly."

Peninsular Diesel distributes 33 basic diesel engines in four different cylinder sizes for trucks, boats, buses and trains; a complete line of Allison automatic transmissions for on- and off-highway use; torque converters; marine gears; and custom-fabricated Detroit Diesel-powered generator sets and power units.

In addition to handling the work for Peninsular Diesel, the B1700 also processes accounts for its sister company, Clarke GM Diesel, Inc., based in Cincinnati.

User Picks Mini Over Mainframe

(Continued from Page 33)

said.

"We have a fail report that tells us if a settlement has not been received when expected; we have a salesmen blotter that tells us at the end of the day what each salesmen has done. We have a purchase and sales blotter that comes out each day.

Our financial location report gives us control over securities and lets us know where such securities can be physically located," he continued.

The system helps the division know what actually is in inventory and is useful in situations in which several people are trading the same blocks of securities. In all, the system generates 30 reports.

Soon the division plans to have a customer activity profile that will tell it what a particular customer does each month to determine what kind of business he's doing and how the bank can improve and expand its service to him.

Besides the Basic/Four CPU, the division's system consists of two CRT terminals, two disk drives, a medium-speed printer and a high-speed printer.

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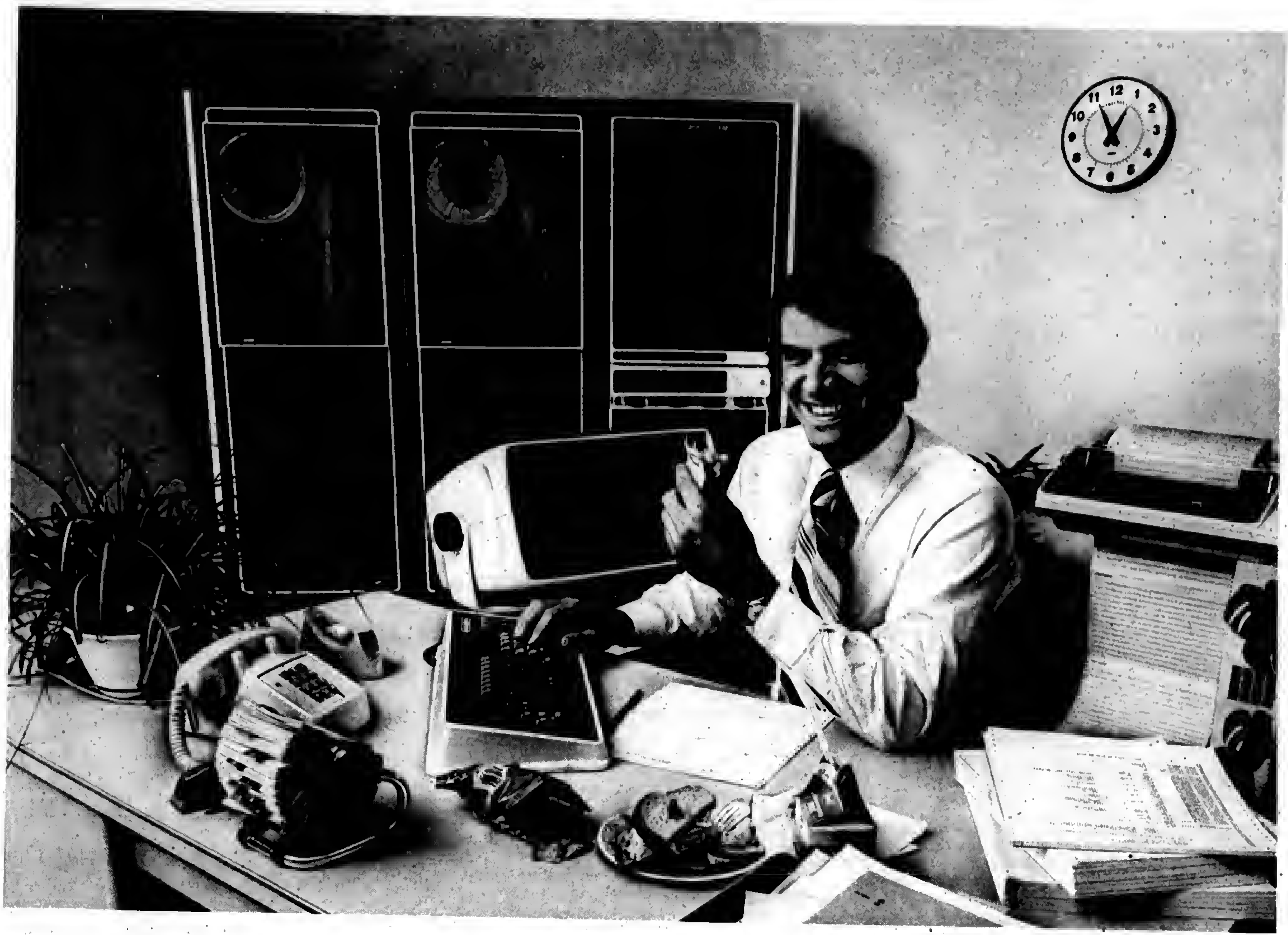

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Evangelical Group Finds Minis Minister to Donor Information

MADISON, Wis. — Two minicomputers, one at headquarters and one in a division, have helped an evangelical organization here gain control over its complicated donor information system, according to officials of the society.

Inter-Varsity Christian Fellowship (IVCF) ministers to students and faculty at 800 colleges, universities, nursing schools and other institutions. Important to financing this effort is a donor information system, according to Robert Ford, director of headquarters services.

IVCF began its DP history in 1969, when it contracted with a service bureau with an IBM 360 to handle the mailing program.

The organization, however continued to grow at a rate that in the last several years has averaged about 25%. In 1971 various other programs were written and IVCF switched to a Madison bureau with an IBM 370/145 VS system; finally the association moved to time-sharing on a Univac 1100.

When the time came to move DP completely in-house, IVCF looked at mainframers and minimakers alike, "but the prices the mainframers were talking about" eliminated them, David Sironi, DP director, said. Minicomputers seemed a logical choice and the fellowship considered General Automation, Data General and Varian systems, among others.

Sironi compromised some of his requirements — such as his stipulation that the programming be done in Basic — in order to get a system the organization could afford. At the same time IVCF came in contact with an OEM that recommended the Mini-Computer Systems, Inc. Micos system.

The DP manager went to the vendor's headquarters, became acquainted with the operating system and language and decided it would do the job. IVCF then contracted for a completely turnkey system, which was delivered to specification.

The software was even tested on the OEM's system before the organization received its hardware, Sironi said.

Operations began last July. Donations are now entered on the day of receipt four days out of five — Monday is usually an exceptionally busy day and often requires carryover to the next day.

Receipts can be produced and in the mail within 48 hours, while address changes are also executed in that time span — both signs of effective list management, Sironi said.

The Micos system consists of a CPU with 64K memory, three 80M-byte disk drives, five CRT terminals, a 600 line/min printer, a 9-track tape drive and a printing terminal.

The cost? The operating system and equipment cost $110,000 and the software $33,000. Ford projected that labor and service bureau savings will pay for these expenditures within four years.

The installation at the Literature Division at Downer's Grove, under business manager Herbert Criley, is much the same as at Madison. The division had done its own order entry and inventory control software and added to this the accounts payable and general ledger packages developed by Mini-Computer Systems for Madison.

The Literature Division includes the Inter-Varsity Press, with 300 titles, a nine-times-a-year magazine, two bookstores and related operations. The computer services all accounts payable and the general ledger for the entire division and the order entry and inventory control functions for the press.

Megamini Prices Cut

OCEANPORT, N.J. — Interdata, a unit of Perkin Elmer Data Systems, has lowered prices for its 32-bit Model 8/32 Megamini up to 23%.

The basic 8/32D with 256K bytes of mainframe memory now costs $63,100, down 11% from its previous price of $70,900. The 512K-byte configuration has been repriced at $89,100, down 17% from the former $107,400.

The 768K-byte version is now $114,100, down 20% from $143,900, and the 1M-byte version costs $139,100, a 23% savings from the original price of $179,900.

The price reductions are effective immediately, Interdata said from headquarters in Oceanport, N.J. 07757.

Searcher Finds Flexibility

(Continued from Page 33)

min reader, the 90/30 system provided the firm with 50% more capacity and speed than the 3/10, Chismark said.

Chismark anticipates a system upgrade to add more disk in the future.

"When the system was installed, we were able to cut back from an eight-hour shift to five and a half hours," he recalled. However, because requests for processing from within for management reports have increased along with the number of searches performed, the system has gone back to the eight-hour shift.

Ordered in September 1976, the system was up and running by Jan. 1. More than 200 programs were converted to the system with the aid of Univac in less than three months.

"Previously, searching public records to identify judgments and liens was a time-consuming and tedious process. But computerization of the records has eliminated these problems," Chismark said.

"Our reports are more accurate because a computer search eliminated the errors that can occur in a manual search," he pointed out. "In addition, we conduct phonic searches in which the computer looks for names that sound the same as well as conventional searches for names with the same spelling."

Operated under the overall supervision of business manager Jeff Bope, computer operations are conducted by DP manager and programmer Mark Swanson, who directs a staff of three people.

To provide computerized judgment and lien services, Law Bulletin Title Services maintains a computer file of 700,000 names related to seven statutory years of data for any of 1.2 million parcels of Cook County real estate.

The data file is updated daily. Judgments and liens filed one day are microfilmed in the Cook County recorder's offices, punched onto cards and entered in the system so computerized searches for the data can be made the morning of the next day. About 400 to 500 judgments and liens are entered in the system every day.

When requests are made for judgment and lien searches, names of parties are entered in the system which prints out reports for each request. To ensure accuracy, the system uses an internally designed program to perform two separate alphabetic and phonic searches on each name.

The alphabetic search finds all names spelled exactly as requested, while the phonics search identifies names that are similar in sound to protect against misspelled or misrecorded entries.

Containing all pertinent information about any judgment or lien found to be of record, system reports are delivered within 24 hours following receipt of service requests. Copies of source documents are also made from microfilm and provided on request.

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The State of Indiana, Department of Administration, Data Processing Division, is accepting sealed proposals on a financial-leasing agreement on an IBM 370/168-M33 Computer System, part of which is currently installed and the rest on order from IBM due for installation in August, 1977.

The proposal includes purchase from the State of an installed IBM 3165-II Model K Computer System.

Proposals must be received in room S07 at the State Office Building Indianapolis, Indiana, by 10:00 A.M., Legal Time, August 18, 1977.

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Radio Shack Retails Z80-Based System

FORT WORTH, Texas — Radio Shack has introduced a fully assembled Z80-based microcomputer with keyboard, CRT terminal and cassette unit.

The TRS-80, which observers have expected for the last six months, retails for $599.95.

The unit comes with 4K bytes of read-only memory (ROM) and 4K bytes of dynamic random-access memory (RAM). The memory is internally expandable to 12K bytes of ROM and 16K bytes of RAM. A total memory capacity of 62K bytes is possible with the system.

The terminal is memory mapped and all graphics and alphanumerics can be controlled by commands in Basic, according to a spokesman. The unit also features cursor control and automatic scrolling.

When creating text, the terminal gives 16 lines of 64 characters, which can be software-selectable to 32 characters. The graphics capabilities permit 128 by 48 picture elements.

Radio Shack TRS-80

The microcomputer has a built-in 53-key integrated Ascii keyboard and an expansion port for additional memory and peripherals, he added.

The Radio Shack Level 1 Basic software resides in 4K bytes of ROM. It features standard Basic statements; floating-point arithmetic; numeric, array and string variables; graphics commands; and cassette save and load commands.

Special commands include "Clear Screen," "Set X,Y," "Reset X,Y," "Point X,Y" and "Formatted Print." The display is 12 in. diagonal.

There are five current software applications packages available from Radio Shack. Blackjack and backgammon, with instruction sheet and a single cassette, is free. A cassette folio for payrolls of up to 15 people wiht a manual and sample instruction sheet costs $19.95.

An education application, Math I, covers multiplication, addition and subtraction and comes with a teacher's guide. It is priced at $19.95 for a three-cassette portfolio.

A kitchen application consisting of menus, conversion tables, a computer directory and message center costs $4.95, and a personal finance application consisting of seven cassettes costs $14.95.

The microcomputer can be purchased individually for $399.95; the system is available at Radio Shack stores nationwide.

Micro Bytes

APL Interpreter Contest Features $1,000 Prizes

PETERBOROUGH, N.H. — Byte Publications, Inc. has begun "The Great APL Interpreter Contest" with one or more $1,000 prizes for winners.

Contestants are free to write interpreters for any microprocessors they choose, according to a Byte spokesman. Entries will, however, be judged on suitability for use on small systems with a minimum of 16K bytes of memory, as well as "program elegance" and efficient use of space.

Entries must be in the form of a publication-quality manuscript which describes the implementation of the interpreter and includes source code and object code, he said.

Contestants should also submit machine-readable source and object code in the form of paper tape or cassette tape. Entries should be postmarked before midnight Feb. 28, 1978.

Persons interested in entering the contest should contact Carl Helmers or Chris Morgan at Byte Publications, Inc., 70 Main St., Peterborough, N.H. 03458, in order to be included in mailings of further information of the contest's progress.

Digital Design Course Set

WASHINGTON, D.C. — A short course on practical digital design and applications will begin Nov. 5 at George Washington University here. The course is designed for electronics technicians, hobbyists and others who are interested in understanding and applying digital design techniques, acording to a spokesman.

The object of the course is to enable the student to develop skills for designing with digital circuits and to better understand the operation of digital devices. There will be greater emphasis on practical applications than on theory, according to the university spokesman.

The course, which costs $180, will be held Saturday afternoons through Dec. 17. Prospective students should contact the Director of Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Tylog Mailing Label Software Designed for 8080 System

MIAMI — Tylog Systems, Inc. has introduced a general-purpose mailing label software package for 8080-based microcomputers.

The Micro-Label System creates mailing labels and can be used for similar label applications, according to a spokesman. The system was designed for nontechnical personnel.

The software is formatted to run on an 8080 processor using dual North Star Computers, Inc., minifloppy disk drives and a pin-feed or tractor-feed impact printer. The software permits the label files to be printed in more than one sequence; error editing and restart capabilities are also provided.

Each master file can hold over 540 records, with multiple files being used for longer lists, the spokesman noted.

The program comes in seven modules including the Update module to add, change and delete to an existing master file or create a new file, the extract module, which creates a key file by name, Zip Code or Zip and name; and the Sort module, which sorts key files.

The Reorganization module reorganizes the master file and removes deleted records; the Print module prints mailing labels and restarts at any record; the Copy Module is used for general-purpose file copy; and the Read module was developed for general-purpose read and print.

The standard label format allows any length print line up to 132 columns with one to 20 labels across.

Program runtimes include an 8 sec maximum update response time, a 30 min maximum sort time, a 5 min maximum extract time and a 12 min maximum reorganization time, according to the spokesman.

Options include custom record formats, custom sorts and custom label height.

The standard software system costs $500 and options cost $40 each from the firm at 9805 S.W. 152 Terrace, Miami, Fla. 33157.

Infinite Micro Built With RCA 1802

MELBOURNE, Fla. — A microcomputer based on the RCA Comsac 1802 microprocessor unit (MPU) chip is available from Infinite, Inc. in either preassembled or kit form.

Features of the UC 1800 include built-in keyboard programming; digital hexidecimal display for address, memory contents and I/O port; front-panel control; 256-byte random access memory (RAM) externally expandable to 65.5K byes RAM or read-only memory (ROM); and a single power supply.

Software included with the UC 1800 contains Keybug, a keyboard handler and debug program for generating and debugging programs. Documentation includes over 200 pages of material that covers both hardware and software.

A software library of diagnostics, games and macro-building routines is also available, Infinite said.

The UC 1800, as a complete assembly with cabinet and documentation, costs $495. In kit form with complete documentation, it sells for $389.

The UC 1800HK hobbyist kit, which contains all but the "garden-variety parts," costs $129.95 and is intended for the experienced kit builder, according to a spokesman.

Infinite is at 1924 Waverly Place, Melbourne, Fla. 32901.

North Star MPU Has Floppy Disk Memory

BERKELEY, Calif. — North Star Computers, Inc. has introduced its Horizon microcomputer. Based on a Z80 microprocessor unit (MPU), the Horizon includes 16K bytes of memory, a disk controller with one or two Shugart minifloppy disk drives and full extended disk Basic, the vendor said.

A serial I/O port is included for connection to any terminal, with standard transmission rates, a spokesman added.

System options include additional disk drives, hardware floating-point arithmetic board, 24-line by 80-character upper and lower case CRT controller board and 16K memory board with parity check.

The controller board reportedly displays 480 by 250 resolution graphics on a TV monitor, the spokesman claimed.

The single-drive Horizon-1 sells for $1,599 in kit form and $1,899 assembled. The dual-drive Horizon-2 sells for $1,999 and $2,349 from the firm at 2465 Fourth St., Berkeley, Calif. 94710.

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A little over two years ago the first firm started in microcomputers: MITS. By last August there were about 50 firms, all small. Today there are over 500 firms making microcomputer systems, accessories, peripherals and software — virtually all of them new companies.

Since projections are that the micro field will soon be larger than the mini and maxi sales, perhaps it is time for you to check what is happening. Sales are doubling about every four months, with no slow down in sight — just in case you may be thinking ahead.

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Board Game, Micro Meet In 'Code Name: Sector'

SALEM, Mass. — The microprocessor and the traditional board game have met in the form of Parker Brothers' game — "Code Name: Sector."

In the game, the players' opponent is the micro that governs the movements of the submarine rather than those of fellow players.

The object of the game is to sink a submarine whose movements are guided by a Texas Instruments Corp. 0970 series chip.

Distance Calculated

The distance between a player's destroyer and the submarine is calculated after each player's move and shown on a small display screen. The screen gives only the distance, not the direction, by which the two ships are separated.

When the submarine is sunk, the screen says "sub," a spokesman explained.

The submarine moves in a straight line until it approaches shore and then rebounds, heading in another direction. It moves one square every time a player shifts the position of his destroyer. The game accommodates four players.

Those wanting a more difficult game can initiate the "evasive" mode which allows the submarine to change directions randomly. There are 4,800 possible undersea positions, and the submarine starts at a different one each time.

When a player feels he has found the submarine, he selects one of three depths at which to fire a charge. If the incorrect depth — or one not selected by the microprocessor — is chosen, the submarine fires at the destroyer, thus giving it a new position on the chart.

Players select the direction in which they move and can move up to nine spaces by pressing a button repeatedly until nine is indicated on the screen.

They then press an enter code and the micro assimilates the new position and divulges the distances between that particular ship and the submarine.

Teaching Mode

There is also a teaching mode, in which the submarine is in a preset position.

The game runs on either a 9V calculator battery or household current and a battery eliminator.

Prices are set by individual stores. However, a spokesman said prices are expected to range from about $28 to $45.

The game will be available in the fall.

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The New PCMs — Part 3

Mainframers Not Seen in PCM Arena

By Molly Upton
CW Staff

NEW YORK — Established mainframers are unlikely to join the rush toward the plug-compatible mainframe market, according to computer industry securities analysts here.

And these mainframers should remain relatively unaffected if the plug-compatible manufacturers (PCM) and IBM engage in pricing contests, they indicated.

Control Data Corp. had unique motivations for entering the PCM mainframe business, they all agreed, such as a relatively small market share in mainframes and a bustling plug-compatible peripherals business.

In addition, James Blair, first vice-president of White Weld & Co., pointed out, CDC did not incur the development costs of the machine.

There was some disagreement about the source of the next entrants in the plug-compatible mainframe arena. Harry Edelson, vice-president of Drexel Burnham Lambert, Inc., said there probably will not be any more Japanese firms, but added there could be more American semiconductor firms entering the fray.

However, William Easterbrook of Kidder Peabody & Co., Inc., thinks Japanese firms such as Toshiba and Nippon Electric Co. (NEC) might be more likely to enter sooner than American semi firms.

Fujitsu and Hitachi are, for all practical purposes, included in the PCM market since Fujitsu makes much of the Amdahl Corp. CPU and Hitachi and Itel Corp. have reportedly agreed to provide a machine.

The mainframers don't have to play the PCM game because they are doing very well under the existing groundrules, Edelson remarked.

IBM is by no means finished with its attempts to make the PCM mainframers look like traditional competitors which have their own lines of software and peripherals, he continued.

The IBM 3033 was an attempt to discourage firms from rushing to join the PCM market, but it didn't wholly succeed, he said.

In the future, Edelson expects IBM to put firmware in its peripherals as well as its mainframes. Thus the PCMs would be unable to hitch their CPUs to IBM peripherals and software. The PCMS have been offering complete systems relying on IBM software and peripherals.

This is the last article in a series that attempted to examine and predict where plug-compatible mainframe manufacturers are going and what IBM is likely to do in response.

Blair feels the concept of firmware is more talk than reality. It's a conversation piece for the next three to five years, but it does make the user think twice.

Purchasers of PCM mainframes are getting a price/performance kicker through their hardware, but it remains to be seen whether they will forfeit a price/performance mid-life kicker through software, by having a PCM machine, Blair observed.

Easterbrook said mainframers that provide both hardware and software will have a distinct profit advantage over PCM. Central to his thesis is his expectation that mainframers will increasingly focus on software, rather than hardware, as the profit generator.

They will control the interfaces linking the hardware and the software, so they will be in a good position to leverage up the profitability, he explained.

In addition, the incremental cost of software is zero, which makes the economy-of-scale argument even more attractive if the vendor has a large base for a market, he indicated.

On the subject of the Japanese, Easterbrook indicated they have traditionally had two shortcomings: lack of worldwide marketing and support staff and lack of strength in software.

If hardware were the basis for

(Continued on Page 40)

CI Notes

Microdata Eyeing CMC Overseas

IRVINE, Calif. — Microdata Corp. has entered into a preliminary agreement to acquire the Computer Machinery Company (CMC) firms in Great Britain, France, Germany, the Benelux countries, Sweden, Denmark, Portugal, Spain and Italy.

Mirodata would pay about $11 million for the purchase, most of which would be in cash and the remainder in the form of convertible debentures and common stock.

Consolidated revenues of the CMC companies in the year ended Dec. 31, 1976 were about $50 million. Microdata had total revenues of $31.7 million in its fiscal year ended Aug. 31, 1976.

Threshold Gains Patent

WASHINGTON, D.C. — Threshold Technology, Inc. of Delran, N.J., has been awarded a patent for a device that improves the clarity of human speech so people can talk to computers.

The device allows an operator to pronounce numbers or spoken orders by taking into account breath noises, such as the tendency to exhale at the end of an isolated word and to inhale at the beginning.

DBMS Services to Star In RCS Revenue Scene

By Toni Wiseman
CW Staff

MENLO PARK, Calif. — The market for data base management systems (DBMS) services is one of the most important — and fastest growing— segments of the remote computing services (RCS) industry.

By 1981, over one-quarter of RCS revenues will come from DBMS services, resulting in an average annual growth rate of 36% betweeen 1976 and 1981.

Those predictions were made in a recent report by Input, a market research firm here.

"The ability for nontechnical (in a data processing sense) people to use DBMS services with minimal help from the vendor will prove to be the major opportunity area for RCS vendors," Input said.

The firm projected the market for DBMS services to nontechnical groups in large and very large organizations will grow from under $70 million per year in 1976 to over $530 million by 1981.

By Input estimates, large-scale service expenditures will rise from $19 million in 1976 to $29 million in 1981, a 9% average annual growth rate.

The expenditures of nontechnical large users will grow an average of 51% annually, from $67 million to $533 million, while technical usage jumps, 22% from $90 million to $242 million during the five-year period, In-

(Continued on Page 40)

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Market Exit Forecast for Some Mini Makers

By John P. Hebert
CW Staff

WOBURN, Mass. — The capabilities of minicomputers "will be just enormous" in the future, but some of the present minicomputer vendors may not be supplying them, according to a speaker at the recent conference here.

Those in the computer industry will see and possibly be affected by the exit of some of the less established minicomputer vendors as they reassume the role of component manufacturers, according to Leonard Farano, executive vice-president of Gambit Management Strategies, Inc.

This migration from the minicomputer ranks will be made by those companies not willing "to accept the role of being dwarves" — a role forced by more competition from the mainframe vendors, Farano said.

The minicomputer has enjoyed and will continue to enjoy a wide success because it helps the user do a better job by tying him to needed data — it brings the user closer to the information, he said.

It doesn't matter that that machine is a minicomputer, Farano said. It could easily have been a mainframe, except that mainframes have too much power and cost too much.

Communications is still "too long a way from being perfect" to allow the next best thing, he added.

Moving on to other forecasts, Farano predicted users will see a leveling in the price of core memory in the near future, although semiconductor memory prices will continue their downward cost trend.

Disk drives are merely electromechanical devices whose density will quadruple over the next four years, but whose prices will only drop by 50%, Farano said.

Terminal and printer prices will also level off because the technology has reached a practical and optimum level in terms of the end user.

And while computational costs have dropped tremendously, the cost of communications has only decreased 2% annually in the last few years, he noted.

Communications will be the single most important factor in the rise of the minicomputer, according to Farano, who asked why anybody would "mess with the telephone company" when they could have a local data base.

But, in view of the advantages of minicomputers, "there are many DPers among us [who] want to hang onto the things of the past — such as large compilers and a data base," Farano said. Minicomputer vendors, like automobile manufacturers, have crammed all the "big car features into compacts" because people want luxury regardless of economy.

Operating systems have gotten larger and marketing terms such as "virtual storage" only serve to keep users conscious of equipment obsolescence, he said.

"Only now are we seeing operating systems which help users avoid monstrous conversions" when they need more capabilities, Farano said, referring to the nonexistence in the past of "upward compatibility," another marketing term.

At the minicomputer end of things, vendors have not had the end user in mind during systems design. The user wants the computer to be a reliable tool to be used purely as a utility, like the telephone. "That's the way it can be successful," he remarked.

Farano said he views the minicomputer manufacturers as "ironmongers, when we would only like to see them make good operating systems."

DBMS Services to Star in Revenue Scene

(Continued from Page 39)

put forecast.

Small users will also show considerable increases in use; increasing their expenditures from $26 million to 1976 to $147 million by 1981, the report said.

"Because of the ways of packaging DBMS services, there is high 'value-added' and profitability potential for vendors in their use," Input stated, noting the fastest growing of these packaging strategies is the development of prepackaged applications by vendors using their DBMS services, a market which accounted for less than $10 million in 1976 but which should reach over $240 million in 1981.

Rapid Implementation

"Of fundamental importance to computer services vendors, users are becoming aware that no one [DBMS] will satisfy all their requirements. Further, the desire to rapidly implement applications to access and use data bases is spreading through organizations like wildfire.

"In-house DP departments are finding meeting this demand extremely difficult," the report observed.

The improvements in price/-performance of processing and storage are reducing the importance of inefficiencies in hardware use when a DBMS is employed, the study noted.

"However, poor performance in standard DBMS, such as [IBM's] IMS, will be ameliorated by conversion of key code routines into firmware through shifts in the HFS boundaries," Input stated, adding that future mainframes will have specialized processor functions for DBMS.

Marketing Strategies

The largest and fastest growing DBMS services are all proprietary, the report said, noting only one of the seven RCS vendors with more than $5 million per year in DBMS revenues uses a third-party DBMS. McAuto uses IBM.

Input suggested five product marketing strategies that vendors can employ in their "value-added" campaign:

- "Self-help," in which the vendor adopts the commodity approach of putting up a DBMS, usually a third-party one, and lets the user go it alone.
- "Language," in which the vendor focuses on customers who intend to do much of the development work themselves.
- "Tool," in which the vendor sells ongoing analytical and inquiry — rather than development — capabilities.
- "Custom programming," in which the vendor uses the DBMS and its own programming staff to develop and operate an application for a customer.
- "Prepackaged applications," in which the vendor uses its DBMS services to develop generalized applications programs which are then implemented for individual customers with modifications.

Not for Mainframers . . .

(Continued from Page 39)

profitability, then it could be argued the Japanese firms would do very well, he conceded.

None of the analysts were very concerned about the effects on the other mainframers of a price war between IBM and the PCMs.

IBM would be affected, but the other makers have a 50-50 chance of remaining unscathed in the near term, according to Edelson. They would be affected only if IBM decides to thwart the competition by cutting prices more than it normally would, he said.

There is a great degree of demand elasticity for large computers, he continued. For instance, if lower prices increase the demand by 1% or 2%, that would be sufficient to keep everyone's growth intact, he said.

It looks as if all the mainframers will keep pace with IBM's pricing because they can't afford to lose market share. It's a matter of how much effect such a move will have on one's margins, he said.

So far, elasticity of demand has compensated for the reduced margins, he observed.

Blair is also impressed with the demand elasticity. PCMs are not displacing previously installed machines, he noted, but represent additional processor power, contrary to the situation six or seven years ago.

The demand stems from the trend to decentralization, Blair said, adding this represents opportunities for the other mainframers as well.

At least temporarily, Blair is bullish on PCMs. The price elasticity has created such a backlog for IBM that the ability to deliver quickly is more important than the price of a machine, he said.

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International News

Turn to Packaged Software

South African Users Tighten Belts

Special to CW

JOHANNESBURG, South Africa — Faced with an economic recession and the recent increase in import duties on computers, computer users in South Africa are turning to service bureaus and packaged software to increase their productivity. In addition, users are replacing large mainframes with a number of small computer systems to reduce costs and gain efficiency.

According to local experts, there are about 1,500 general-purpose computers and about 2,500 minicomputers in South Africa with total installed value of about $600 million.

The commercial and industrial organizations using these systems have been under budgetary pressure caused by the current economic recession, attributable to reduced international investment in the country and lower export levels.

The recession is attributed by local businessmen to the recent slowdown in economic growth in Europe and the international political and economic pressure being applied to South Africa from countries which disapprove of that government's racial policies.

To maintain DP output levels at little or no budgetary increases, and in some cases to achieve budgetary decreases up to 10%, DP managers have been turning to performance monitors, Sort and other utility packages and increased use of outside services to increase their departments' productivity.

Software sellers interviewed here indicate sales are up 30% to 40% so far this year. Also, programming and systems consultants and service bureaus report substantial increases..

In contrast, mainframe makers have been experiencing a difficult time. IBM, after seven years of good business growth, was substantially off its order and revenue targets for 1976, and informed sources say DP sales continue to be slow.

Escom, an electrical utility, recently ordered 30 ICL 2903 small systems to distribute preparation of electricity bills, replacing a number of IBM mainframes in the process.

IBM has about 50% of the South African computer market, while ICL, the second leading supplier, has 25% of the market. The rest is distributed among Univac, Control Data Corp., NCR & Burroughs.

The level of computer sophistication is considered quite high in South Africa. Because the principal cities — Johannesburg, Capetown and Durban — are quite distant from each other and telecommunication costs are attractively low, South Africa operates some of the most advanced and sophisticated data communications in the world.

Opposition to South Africa's racial and separatist policies in the U.S. has caused U.S. computer makers some uncomfortable moments.

IBM's chairman Frank T. Cary was closely questioned at the recent annual meeting on his company's operations in South Africa. He reiterated IBM's position that it cannot impose U.S. policy through restricting use of its computers in other countries, although it would not sell a computer which it knew was intended to be employed for illegal or immoral purposes.

Presumably, local community standards apply in interpreting these judgments. A recent U.S. visitor noted the current largest advertiser in the DP press in South Africa is the Anglo-American Corp., a major gold mining firm.

It is using four-page spreads to recruit personnel for the development of a Human Resources Information System, to be implemented on two IBM 370/158 computers. This system, which will employ some 300 on-line terminals, is described as enabling the "management (in all senses) of the migratory black work force of over 130,000."

Spring Expo in Paris

PARIS — The U.S. Department of Commerce is sponsoring "Printemps Informatique," an exhibition for computers and related equipment to be held at the U.S. Trade Center, here from March 14-17.

Recently completed market research indicates France is an excellent market for American computers and related equipment. French expenditures for computers and peripheral equipment exceeded $1 billion in 1975 and are forecast to surpass $2 billion in 1980.

Continuing demand for new information-processing hardware by business and government should support an average growth of 16% a year in this market during 1975-80, Commerce said.

Imports, which have accounted for almost half of the DP equipment purchased in France in recent years, are expected to maintain their overall market share and are projected to rise above the $1 billion mark in 1980 to represent about 47% of the total market.

For information, contact Helen Burroughs, U.S. Department of Commerce, Room 6318, Washington, D.C. 20230.

European CPU Spread Seen Stable

By Molly Upton
CW Staff

LONDON — The distribution of various brands of CPUs among industry sectors in Western Europe has remained nearly constant over the past two years, according to a study in IDC Europa Ltd.'s *EDP Europa Report.*

Manufacturing has remained the largest user sector throughout Europe and showed the fastest growth in the Benelux countries and in Switzerland, the report said.

IBM had the highest percentage of its base in the process and durable goods manufacturing sectors — 46%.

Burroughs had 28% of its base in manufacturing, Control Data Corp. 15.7%, Honeywell-Bull 15%, ICL 34%, NCR 33%, Univac 39% and Siemens 36%, according to *EDP Europa.*

In the Benelux countries the distribution of computers in the manufacturing areas jumped from 33.7% to 45,9%. In Switzerland the jump was from 35.6% to 40.1%.

Although Scandinavia's process manufacturing grew from 14% to 19.6%, durable goods manufacturing's share of computers dropped from 25% to 16.3% for an overall decline — from 39% to 35.9%.

In the UK, expenditures for computers and peripherals should grow relatively sharply in the banking industry by 1980, according to the report.

For instance, from the 1974 estimated outlay of $58 million, UK banking will probably spend $140 million in 1980. As a percentage of various segments' DP expenditures, banking's share will rise from 8.5% to 11.5% to rank third behind manufacturing and government.

Although expenditures for manufacturing will continue to increase, the percentage will decline from 28.5% to about 21.9%, the report noted.

Manufacturing expenditures for DP in the UK were $195 million in 1974 and are projected to be $266 million in 1980, according to *EDP Europa.*

Government will continue to hold its second place share with 14.5% in 1980 with equipment valued at $176 million.

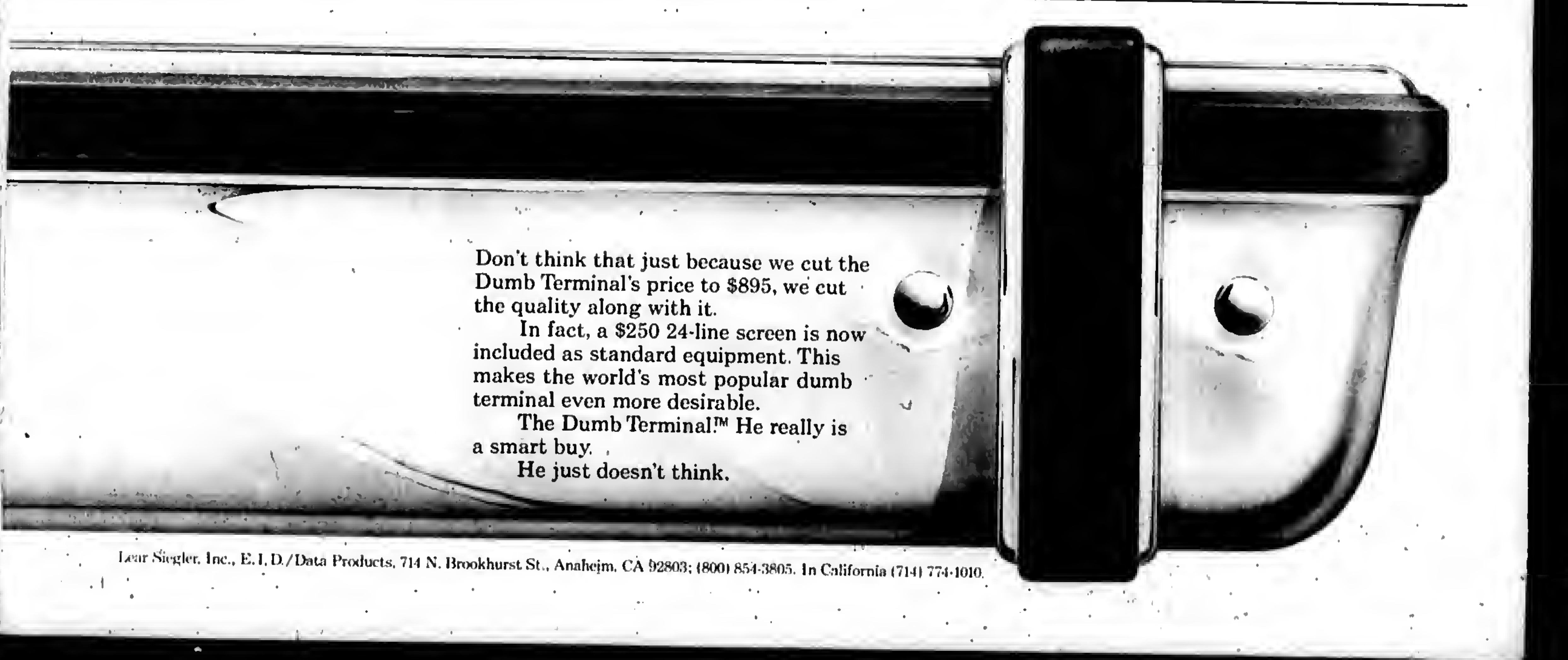
Commerce Slates Expos

WASHINGTON, D.C. — The U.S. Department of Commerce will stage a tandem pair of exhibitions of electronics production and test equipment in France and Germany in November.

The shows are an effort to help U.S. manufacturers increase their share of a Western European market.

The first show will be held Nov. 14-17 at the U.S. Trade Center in Paris. The second will be Nov. 22-26 at the international "Productronica" congress and exhibition held biennially in Munich.

Additional information is available from the Bureau of International Commerce, Room 1015-C, U.S. Department of Commerce, Washington, D.C. 20230.



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Data 100 Boosting OEM Sales, Production

By Molly Upton
CW Staff

MINNEAPOLIS — Data 100 Corp. expects its OEM operations to contribute about $20 million in revenue in fiscal 1977, according to John Roy, general sales manager for OEM.

OEM sales account for between 70% and 75% of the units marketed to the OEM and the rest are consumed by Data 100 end-user products, agreed Roy and Gerry Kaplan, director of marketing support for OEM.

In 1976, Data 100's revenues totaled $121.9 million, of which $75 million came from sales, the annual report indicated.

Data 100's principal OEM product lines are 5M- and 10M-byte cartridge disk drives and line printers from 62- to 600 line/min.

The firm is well positioned to enjoy the projected OEM market spurt in printers in the 60- to 250 line/min range, Roy indicated.

Market surveys forecast these line printers should grow from 4,000 unit/year in 1976 to 18,000 unit/year in 1980.

Began Entry in '74

Data 100 began its entry into the OEM market in 1974 as it sought to vertically integrate its production and also to diversify, Roy said.

For Data 100, the OEM area represented a different market, one which was not lease-dependent and not dominated by IBM.

Late in 1974, it acquired Odec in Warwick, R.I., which had line printers from 62- to 300 line/min. Then in September 1975, it bought Iomec, which had a wide range of product lines. Data 100 sold some of these lines, such as the paper tape and Portaverters, and discontinued others, Roy said.

The disk products were transferred to Minneapolis earlier this year. In July, the firm produced more drives than Iomec had in a month, he said.

At Warwick, the printer line was revamped and new products were brought out. The product line has "changed dramatically," principally through building in reliability and "getting out of the product what was potentially there," Kaplan said.

"We've tried hard to establish ourselves as a quality supplier," which means providing service and various interfaces, Roy indicated.

For example, Data 100 will provide field service for its printers.

Kaplan explained that often customers are not initially real OEMs with their own service force, etc., "so we try to offer more in support."

Non-OEM Products

There are some products Data 100 manufactures but does not offer to the OEM, such as a CRT and the mini used in its remote-batch systems.

Roy said the firm draws lines at what it feels it can effectively offer in the OEM marketplace.

In the disk drive area, the firm has seriously looked at higher capacity drives, Roy said. One thing that has held it back is the lack of unanimity in the industry on what technological approach to take, he said.

He conceded the firm could lose market share by its lateness in developing such a product. But, he added, just as Data 100 got into the disk business through an acquisition, the same approach might be a viable way to enter the larger capacity disk drive market.

size of the printer plant, and the addition is expected to be completed this year, Kaplan said.

Roy said Data 100 is looking at the strategy of offering a full line of printers. However, the low-speed arena is moving toward lower prices, which could mean diminishing returns, he observed.

Data 100 is less enthusiastic about the low end than it is about the speed range of 100- to 1,000 line/min, he indicated.

The boom in printers in the 100- to 300 line/min range is a reflection of the increased demand for small business systems. Several other firms, such as Centronics Data Computer Corp. and Dataproducts Corp., recently introduced products in this range, Kaplan observed.

"Clearly they're moving in the direction we've been going in the last three to five years. Obviously this will cause us to do some things to be competitive, but this is the area in which we're dominant."

Data 100 is already starting to feel the positive effects of increased competition, he indicated. For instance, other firm's customers are looking at all offerings — including Dta 100's — in that particular speed range. "It's opening up some doors," he added.

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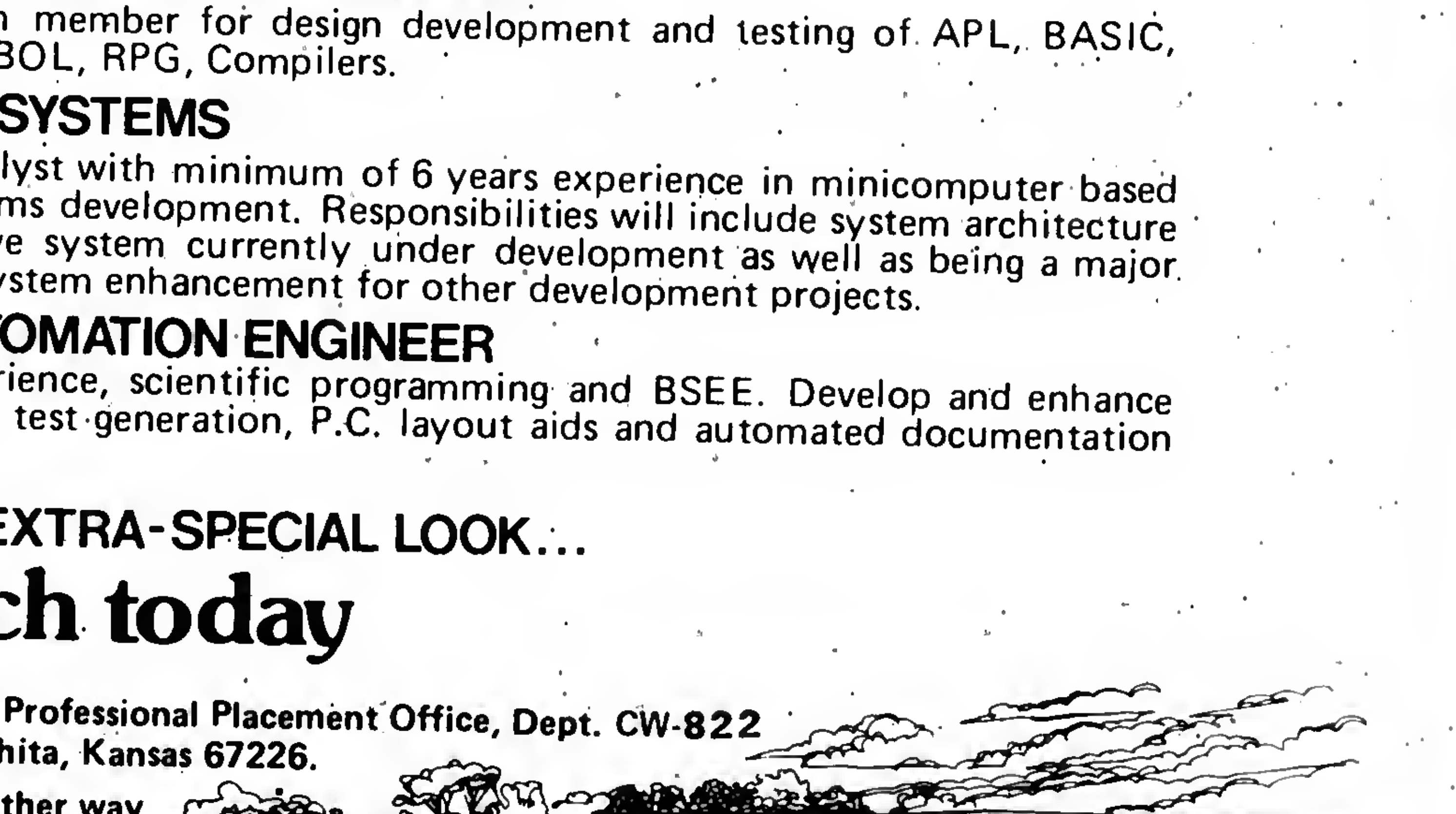

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8K Eproms Bow

SANTA CLARA, Calif. — Electrically reprogrammable read-only memories in 8K bits are available from National Semiconductor Corp. for $32.75 each in lots of 100.

The MM2708 is a 24-pin NMOS device with a transparent lid. It is organized into 1K, 8-bit words, features typical programming speeds of 100 sec for all 8K bits and maximum access time of 450 nsec, the firm said.

The bit pattern of the MM2708 is erased by exposing the transparent lid to ultraviolet light, and a new pattern can then be written into it, the firm added.

National Semiconductor is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

Micro Developers Get Expanded Support

BEAVERTON, Ore. — Tektronix, Inc.'s 8002 Microprocessor Lab enables developers to work with the 8-bit Intel 8080, Motorola 6800 and Zilog Z80 micros as well as with Texas Instrument's 16-bit 9900.

The 8002 provides an operating system which includes a text editor, assembler software for the selected micros and control, command and storage instructions, the firm said.

With the same development system users can evaluate different micros for a single application or several projects with different micros, Tektronix added.

The 8002 cuts debugging time and provides for interaction of hardware and software, thus helping eliminate finger pointing between the hardware and the software, a spokesman said.

The basic unit sells for $9,950 and includes a processor with 16K of system memory, 16K of progam memory and a dual floppy disk unit as well as two assembler software packages.

Options include real-time-in-prototype testing, hardware debug with break-points and 8-channel logic analysis.

Other options are a software-driven Prom programmer and up to 64K 8-bit words or 32K 16-bit words in additional program memory, the firm said.

A minimum software development system with a thermal printer costs around $12,000, while a full system with CRT and printer is around $22,000, a spokesman said.

The 8002 is supported by the Tektronix field service organization.

Tektronix Lab Instruments Division, Logic Development Products may be reached through P.O. Box 500, Beaverton, Ore. 97077.

National Semi Looks Overseas

SANTA CLARA, Calif. — National Semiconductor Corp. has unveiled four CPU and memory cards with standard Eurocard size and bus configuration for use with the firm's SC/MP low-cost development system (LCDS).

The units allow fast construction of 8-bit SC/MP microprocessor systems destined for the European market, the firm said.

The cards are 160mm by 100mm and have 64 edge connectors.

The ISP-8C/100(E) SC/MP CPU card costs $250 in single quantities. The ISP-8C/004(E) RAM costs $225 and the ISP-8C/004 card with empty ROM/ PROM sockets is $125 each.

The ISP-8C/004P(E) card with 4K words of memory is $525 in unit quantities.

National Semiconductor is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

I/O Units Added

SANTA CLARA, Calif. — Intel Corp. has added three analog I/O subsystems and an optically isolated digital I/O subsystem to its SBC 80 single-board computer family.

The analog I/O boards are program- and pin-compatible for the same functions, and all the subsystems interface directly with the SBC 80 system bus.

The SBC 732 analog combination I/O board with 8/16 inputs and two D/A conversion channels costs $1,195.

The SBC 711 analog input board with 8/16 inputs costs $750.

The SBC 724 analog output board with four D/A converter channels and the SBC 556 optically isolated I/O board each cost $395.

Intel's OEM Computer Systems Group is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

AMI Has Vmos RAM

SANTA CLARA, Calif. — American Microsystems, Inc. (AMI) is offering a 45-nsec, 1K by 1 bit static random-access memory (RAM) made from the V-groove metal oxide silicon (Vmos) LSI technology which, according to the firm, is price-competitive with bipolar devices.

The S4015-3 device costs $6.20 in plastic in lots over 100 from AMI at 3800 Homestead Road, Santa Clara, Calif. 95051.

Wintek Lowers Prices

LAFAYETTE, Ind. — Wintek Corp. has lowered the price of its 16K-byte Wince random-access memory (RAM) module to $399.

Other prices on the 6800 modules on industry-standard 4.5-in. by 6.5-in. circuit boards are $339 for 12K, $277 for 8K and $199 for 4K from Wintek Corp., 902 N. 9th St., Lafayette, Ind. 47904.

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OEM Products

SLI Introduces Disk Drive With Winchester Heads

WOODLAND HILLS, Calif. — SLI Industries has announced the Sli Fox disk drive, which it said utilizes standard Winchester heads and media.

The unit includes deck plate, spindle, integral air filtration system, printed circuit board for electrical connection feed-through, disk cover and rotary positioner.

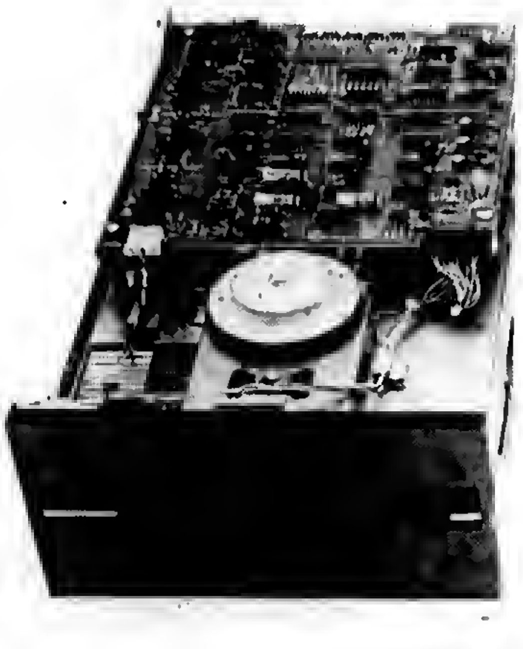
One to four disks can be mounted on the unit to allow a maximum of 70M bytes of unformatted data for each device, the firm said. The average access time is 40 msec.

SLI Industries said it has developed a standard set of servo electronics to support this unit and has its own servo writing capability available in preproduction or production quantities.

The Sli Fox costs $550 in OEM quantities from 21040 Victory Blvd., Woodland Hills, Calif. 91367.

Sli Fox

IBM-Compatible Disk Bows



ANAHEIM, Calif. — An IBM-compatible double-sided floppy disk drive has been introduced by General Systems International, Inc.

Called the FDD 200, the drive's capacity is 1.6M bytes, unformatted, the firm said. Electronics necessary to perform data transfer using only the interface-specified control commands are included.

A software interlock, which guards against operator error during data transfer, adds about $25 to the drive's price, which is in the low $400 range for OEM quantities.

The firm is at 1440 Allec St., Anaheim, Calif., 92805.

EMM Has Core For Rugged Sites

CHATSWORTH, Calif. — Electronic Memories and Magnetics Corp.'s (EMM) Severe Environment Products Division has unveiled the Sems-14, a core memory with a 32K by 18-bit basic module that stores 655K bits of data.

Operating speeds include an access time of 250 nsec and a cycle time of 600 nsec, the firm said.

Temperature range is -55°C to +85°C. Dimensions for each module are 6.4 in. by 9 in. by 1.4 in.

Bulk Memory Unit

A bulk memory unit can be concurrently developed to contain eight Sems-14 modules, power supply and interface circuitry and provide 256K by 18 bits of mass storage, EMM said.

The quantity price is $9,900 from the Severe Environment Products Division, 20630 Plummer St., Chatsworth, Calif. 91311.

GSI Has Autoloader For Floppy Diskettes

ANAHEIM, Calif. — General Systems International, Inc. (GSI) has introduced an automatic loader of floppy diskettes for use with its FDD 110 drive during certification and initialization processes.

The Model H155 horizontal autoloader permits processing of up to 30 diskettes without operator assistance, GSI said.

Data Transfer

The H155 can separate accepted and rejected diskettes into two bins. It can also be used for data transfer from cards, cassettes or tape to sequential diskettes for other tasks which require more memory than a single diskette can contain, the firm said.

Cycle time to load and unload the FDD 110 is less than 1 sec, a spokesman added. In single quantities, the H155 costs $3,500 from GSI at 1440 Allec St., Anaheim, Calif. 92805.

COMPUTERWORLD INDEX

SUBSCRIBE TO THE 1977 COMPUTERWORLD INDEX AND GET SIX MONTHS OF REFERENCE INFORMATION FREE.

The new Computerworld Index, published quarterly and cumulative, is an invaluable reference tool for organizations that have a need-to-know about what's going on in the computer world.

The first issue of the Index for example, covers the last six months of 1976, and it includes more than 4,000 entries by subject, author and name of any company mentioned. It breaks topics down into highly usable and convenient categories:

- There are entries by *product or service*, like *PRINTERS*, which has 37 entries in the six-month period covered; or *LEASING*, which has 10.
- There are entries by *industry*, like *INSURANCE*, under which there are 17 entries for various stories on the use of computers in the insurance industry.
- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory*, security and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- ... and there are *others: KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries ... and there's much, much more.

Company Names, for example, are a very important part of The Index. Looking under IBM, we find *ten* categories:

- IBM GENERAL
- IBM LITIGATION
- IBM SOFTWARE
- IBM SYSTEM 3
- IBM SYSTEM 7
- IBM HARDWARE
- IBM PRICING
- IBM POLICY
- IBM SERIES 1
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Computer Management is a monthly magazine recently purchased by *Computerworld, Inc.* Monthly circulation is 30,000.

COMPUTERWOCHE
GERMANY

World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by *Computerworld, Inc.* It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
JAPAN

World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*

Shukan is a weekly tabloid newspaper, jointly owned by *Computerworld* and Dempa publications. Circulation is 35,000.

ZERO-UN INFORMATIQUE
FRANCE

World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$223 Million*
Rank as importer from US: *Fourth*

Computerworld represents Zero-Un Informatique in the US. Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000; the second a monthly magazine, circulating 13,000 copies; and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS
BRAZIL

World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*

DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by *Computerworld, Inc.* and has a circulation of 7,000.

Computer Management
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Please write or send resumes to Bill McVeda, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520.

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We are seeking experience on IBM 360/DS in any one of the following areas:

Simulation of air traffic patterns. Knowledge of JOVIAL a plus.

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Software test and validation including development of tools to test and validate real-time software systems.

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Positions are located in Jacksonville, Florida.

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Current positions in support of our Goddard Real-Time System, Space Tracking Data Network and Dn/Dff Site Project for the NASA Goddard Space Flight Center require a degree in Computer Science, Math, Physics, Astronomy, Meteorology or Engineering with experience using FORTRAN and/or Assembly languages on large-scale or mini-computers. These skills will be applied in the following concentrations:

- Telemetry application with multi-computer configuration
- Integration and testing of real-time display software
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CSC offers a liberal relocation policy in addition to a complete benefits package. For immediate consideration please send resume or call:

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265 City Hall
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The Computer Center of a comprehensive state college, responsible for computational services for academic and administrative needs, has three positions available in administrative data processing. We are expanding our facilities to a DECsystem-10 and if you qualify and would like to grow with us in an on-line environment, you may be interested in one of the following positions:

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Able to design, develop, program and maintain information and reporting systems. Three to four years of programming using COBOL with systems design experience and knowledge of the DECsystem-10 or other major time-sharing system required. Accounting background and/or experience in college environment with on-line systems preferred. Salary: $14,748.

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Position requires one to two years of solid COBOL programming experience and ability to assist in determining and analyzing the system needs of users. DECsystem-10 or other major time-sharing system background preferred. Salary: $13,489.

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Requires supervisory and computer operations work and ability to coordinate the activities of the data entry and I/O units. Must have DECsystem-10 or similar equipment experience. Salary: $12,335.

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- Experience with DEC PDP 11/35 or higher level computers required.
- Requires a background in minicomputer or microprocessor systems and/or associated application programming.

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- Requires experience in general purpose applications minicomputer programming of peripheral devices, at the assembler level.
- Responsibilities will include the definition and supervision of coding of applications oriented F/W to interface POS terminal peripherals to the base ECR.

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- Requires experience in data communications minicomputer programming at the assembler level.
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- Requires an engineer or hardware-minded programmer with minicomputer programming experience and a flair for the challenge of diagnostic test software.

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- Development of telecommunications and time-sharing system software for IBM 360/370 computers. Design and implement specialized and general purpose time-sharing software (e.g., TSO commands, text editors) and telecommunications software (e.g., TCAM, 3705 EP/NCP control system. Familiarity with communications concepts and protocols (e.g., SDLC, HDLC, etc.).
- Requires: BS/MS Computer Science, Engineering or Mathematics, plus in-depth knowledge of IBM MVT/MVS system software (particularly TSO/TCAM) and 3 to 5 years systems programming experience.

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- Software design and implementation of data acquisition systems using minicomputer and microprocessor control techniques. Applications include modem simulation, spacecraft telemetry and tracking systems, remote sensing and data collection systems. Experience with distributed intelligence systems using assembly language coding techniques.
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For these positions we require individuals with a Bachelors degree or equivalent in a related technical field. All applicants should have several years in-depth experience in computer programming, systems analysis, technical marketing or sales support. In-depth knowledge of General Purpose or Intelligent Terminals essential. Duties will include assisting sales department in proposal generation, presentations, trade shows and sales training. Good written and oral communication skills are essential. Related background in the insurance industry would be a plus.

In addition to excellent starting salaries and comprehensive company benefits, we also offer exceptional working conditions at our modern facility in Trumbull, Connecticut, one of the most up-to-date in the industry with easy accessibility to New York and Boston.

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The Software Documentation people we're looking for probably aren't looking for a job.

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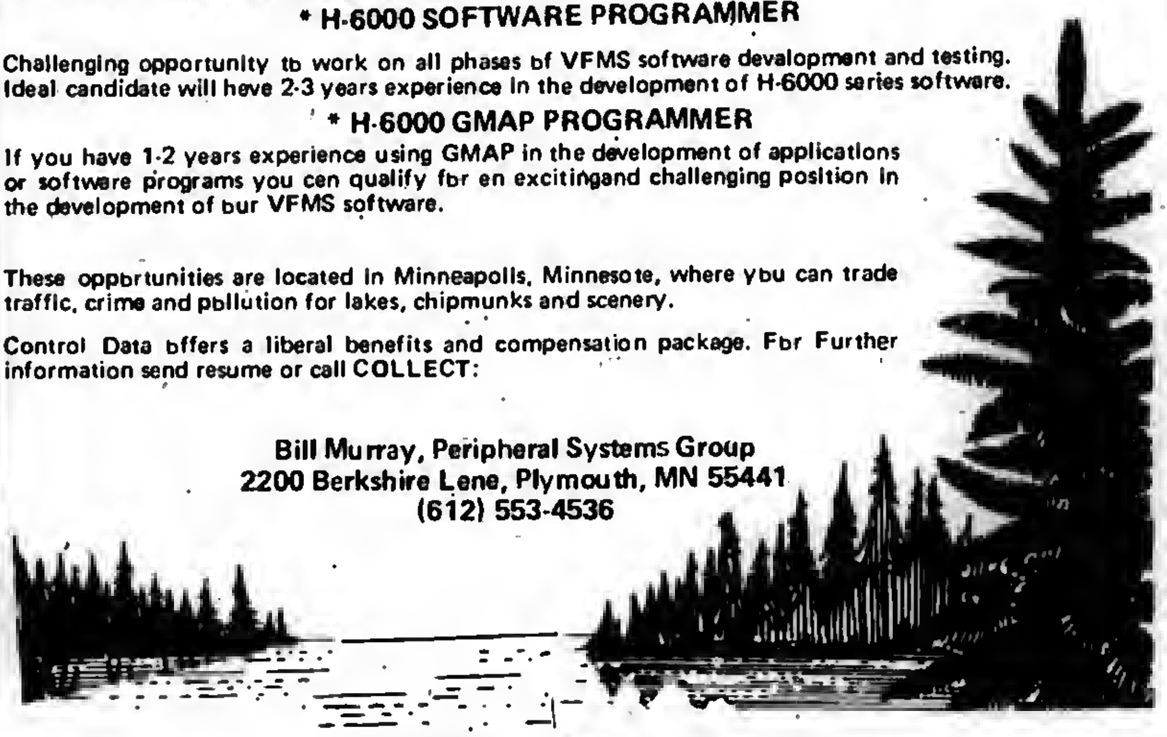

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We are searching for an individual fluant in Garman and French with 10 years experience in communications systems, 8080 machine language and assemblers. In addition, candidetes must be familiar with European markets and their applicable data communications, packet switching, and network protocol.

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We are seeking candidates:

- Who have experience in HASP, OS/MVT, VS2R1.7 (SVS), VS2R2, or any combination.
- Who have experience with the implementation and/or support of a large data base/data communication system (i.e., INTERCOMM; CICS; TOTAL).
- Who are seeking high visibility in a performance-oriented environment.

Interested? Pick up the phone NOW and call: John J. Schwepe, Manager, Operations Software Department. Please call collect 419/422-2121, Ext. 2951. It will take just a few minutes of your time. (We will accept calls weekdays from 8:00 a.m. to 4:00 p.m. EDT.)

These positions are located in Marathon's General Offices in Findlay, Ohio, and offer a salary commensurate with education and experience and a complete benefits package. Principals only, no agencies.

MARATHON **Marathon Oil Company**

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DATA PROCESSING PROFESSIONALS

Career Opportunities now available with a progressive data processing installation in one of the fastest growing electric utilities in the southeast. Current environment includes IBM 370/158 and 370/155 OS-VS2, batch and on-line applications using both CICS and TSO, several major new development projects. We have immediate openings for the following:

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Must have experience in the design, analysis, and implementation of large applications. Strong accounting systems knowledge needed. Also, need analysts with experience in developing and installing all aspects of remote on-line systems. Must have ability to function on systems with heavy user involvement. Strong technical background desirable. Degree preferred.

APPLICATION PROGRAMMERS

Requires 3-5 years experience primarily with COBOL. Working knowledge of structured programming concepts desirable. Experience with IBM hardware and software, OS-JCL, and CICS will be a definite plus. Degree in Computer Science, Math, Statistics, or related area preferred.

PROGRAMMER/ANALYST

Major responsibilities will be in the area of engineering support functions. Must be capable of using a structured approach to problem solving for engineering and scientific applications. Requires solid background in FORTRAN, PL/I, or COBOL with a minimum of two years experience. Degree required.

SYSTEMS PROGRAMMER

Requires a minimum of two years of systems programming experience with CICS. SVS or MVS background desirable. Degree required.

Only highly motivated, result-oriented individuals with proven record of accomplishments need apply. Principals only!

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If you are interested in being considered for one of several new positions with us, please send your resume and salary history/requirements to Thom Harris.

NCR

Special Systems Division

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Cornell University is located in Ithaca, New York, a small city in the Finger Lakes area of central New York. While enjoying freedom from pollution, traffic jams, and other urban problems, Ithaca is still a stimulating and intellectually active environment, and the lakes, parks, and nearby rural setting provide many recreational opportunities.

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The Systems Maintenance Chief is responsible for the day-to-day software operation of Cornell's 370/168, running VM/370 and OS/MVT-HASP; for the evaluation, scheduling, and installation of software changes to the system; for hiring, training, and supervising maintenance staff, and for a variety of related activities. Minimum qualifications include a background in the relevant software areas and capability in management and administration.

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This position will be responsible for the development, operation and maintenance of automated systems which provide on-line and off-line computer use accounting, and for resource utilization and related management information functions. Although this position will initially be involved with the 370/168's VM and OS/MVT systems, future areas of activity will include accounting and management information for communications networks and distributed computing facilities. Previous experience in the design and implementation of business systems is essential, and management experience and growth potential are highly preferred.

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Office of Computer Services, Langmuir Laboratory, Cornell University, Ithaca, N.Y. 14850. Cornell University is an Equal Opportunity Employer.

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Degree in Engineering, Mathematics, Economics or Computar Science. 2 to 3 years programming experience preferably with on-line manufacturing systems. Experlençe in COBOL and ASCII, Univac 1100 series as well as Real Time Data Collection System preferred.

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Responsibilities include systems design, user interface end development, planning and implementation of OS/VS systems. Project leader experience desirabla. 5 years COBOL programming with 3 years system's design work experience in financial applications necessary, PL1 experience desirable.

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The person we need should have a minimum of three years writing experience in computers and electronics, preferably with the trade press. A familiarity with photography as it relates to product publicity is desirable.

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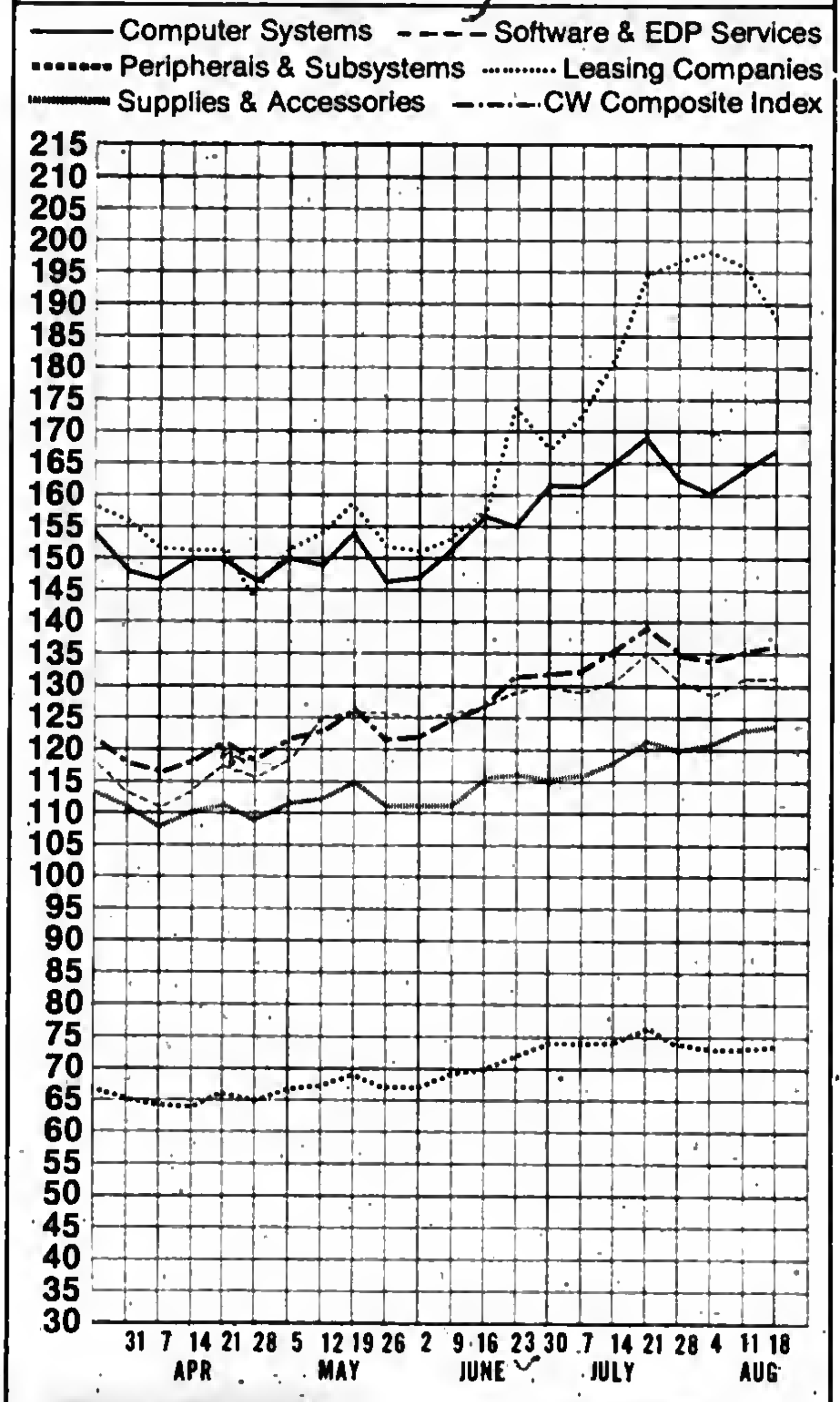

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Nine Months Ended May 31

	1977	1979
Shr Ernd	$.69	$.29
Revenue	30,013,000	21,881,000
Earnings	1,197,000	435,000

AT&T
Yeer Ended Mey 31

	1977 (000)	1979 (000)
Shr Ernd	$8.56	$5.46
Revenue	34,375,499	30,600,450
Earnings	4,202,040	3,387,823
3 Mo Shr	1.80	1.51
Revenue	8,975,743	8,118,837
Eernings	1,159,530	939,660

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEONESOAY, AUGUST 17, 1977

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 17 1977	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMOAHL CURP	0- 39	37 1/4	+3 1/4	+9.5
N	BURROUGHS CORP	55- 91	71 3/4	- 1/8	-0.1
O	CCMPUTER AUTOMATIGN	19- 30	29 5/8	+1 7/8	+6.7
N	CONTROL DATA CORP	20- 26	20 7/8	- 1/8	-0.5
N	OATA GENEPAL CORP	35- 50	49 1/4	+ 7/8	+1.8
N	DATAPOINT CORP	18- 30	29 3/8	+2 3/8	+8.7
N	OIGITAL EQUIPNENT	37- 53	49 1/2	+1 1/4	+2.5
N	ELECTRGNIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	9- 10	8 5/8	+ 1/8	+1.4
O	FCUR-PNASE SYSTEMS	13- 17	15 5/8	+ 3/4	+5.0
N	FCX8CRG	42- 54	47 1/2	+ 1/8	+0.2
O	GENERAL AUTGMATION	6- 9	6 7/8	+ 1/8	+1.8
O	GRI CGMPUTER CORP	1- 1	1/2	0	0.0
N	NEWLETT-PACKARO CO	69- 87	94	+1 1/2	+1.8
N	HONEYWELL INC	44- 55	51 1/2	- 1/8	-0.2
N	IBN	245-286	268 3/4	+ 1/2	+0.1
O	MANAGENENT ASSIST	5- 9	7 3/8	+ 1/2	+7.2
C	MENCREX	23- 30	29	+2 1/2	+9.4
O	MICROOATA CORP	7- 18	10 3/4	+ 3/8	+3.6
C	MODULAR COMPUTER SYS	5- 8	7	0	0.0
N	NCR	32- 46	45 7/9	+ 5/8	+1.3
O	PRINE CJNPUTER INC	12- 18	18	+ 1/4	+1.4
N	PERKIN-ELMER	17- 22	20 7/8	+ 7/8	+4.3
N	RAYTHEON CG	16- 33	28 1/4	-1 1/2	-5.0
N	SPERRY RANO	34- 42	36 3/4	+1	+2.7
C	SYCOP INC	8- 15	9 3/4	0	0.0
A	SYSTEMS ENG. LABS	5- 9	6 5/8	- 5/8	-8.6
N	VARIAN ASSOCIATES	15- 21	17 1/4	0	0.0
A	WANG LABS.	10- 21	12 1/2	+ 3/4	+6.3
	LEASING CONPANIES				
C	BCOTHE COURIER CORP	8- 10	10 5/8	+ 5/8	+6.2
C	CCMOISCU INC	10- 13	11	0	0.0
A	CCMMERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	CONPUTER INVSTRS GRP	1- 2	3/4	-	-7.0
P	OATRONIC RENTAL	1- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2	+ 1/8	+6.6
N	UPF INC	6- 9	7 7/8	0	0.0
N	ITEL	13- 20	19	- 1/8	-0.6
N	LEASCC CURP	19- 27	24 1/4	- 1/2	-2.0
C	LEASPAC CCRP	1- 2	1	0	0.0
C	NFG INC	0- 1	1/8	- 1/8	-50.0
A	PIGNEEP TEX COPP	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 15	14	- 3/4	-5.0

EXCH: N=NEW YORK; A=AMERICAN; P=PNIL-BALT-WASN
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 R.N. OR LAST BID
(1) TO NEAREST OCLLAR

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 17 1977	WEEK NET CHNGE	WEEK PCT CNNGE
	SOFTWARE & EOP SERVICES				
C	AOVANCEG COMP TECH	1- 2	7/8	- 1/8	-12.5
O	ANACOMP INC	7- 10	9 3/9	+ 7/8	+10.2
A	APPLIEO OATA RES.	5- 10	7 5/8	- 7/8	-10.2
N	AUIOMATIC OATA PROC	23- 30	30 3/8	+1 7/8	+6.5
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	+2	+20.0
C	COMP ELECTICN SYSTNS	6- 10	9 3/8	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
C	CCNPUTER NETWORK	6- 9	9 7/8	+ 1/2	+5.9
N	CCMPUTER SCIENCES	7- 9	8 3/8	- 1/2	-5.6
O	COMPUTER TASK GROUP	1- 2	1 3/4	+ 1/2	+40.0
C	CCMPUTER USAGE	1- 3	1 1/2	0	0.0
O	CCNSHARE	5- 7	6	0	0.0
O	OATA OIMENSIONS INC	3- 5	3 1/8	0	0.0
O	OATATAB	1- 2	1 3/4	0	0.0
N	ELECTRUNIC OATA SYS.	16- 20	18	+ 1/8	+0.6
C	INSY7E CORP	2- 3	1 3/4	0	0.0
C	IPS COMPUTER MARKET.	1- 2	1 1/2	- 1/8	-7.6
O	KCANE ASSOCIATES	3- 4	3 3/4	0	0.0
O	KEYOATA CCPP	2- 3	1 5/8	0	0.0
A	LCGICON	7- 17	12 1/2	+ 1/4	+2.0
A	NANAGEMENT OATA	1- 2	1 3/4	0	0.0
A	NATIONAL CSS INC	19- 25	24 1/4	+2	+8.9
O	NATIONAL CA7A CORP	4- 7	5 5/8	- 1/8	-2.1
A	ON LINE SYSTENS INC	17- 22	17	-1 1/8	-6.2
N	PLANNING RESEARCN	3- 6	4 7/8	- 1/4	-4.8
C	PROCRANMING C SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	2- 3	2 3/4	- 1/8	-4.3
O	REYNCLUS & REYNOLO	17- 20	18	- 1/4	-1.3
C	SCIENTIFIC CONPUTERS	1- 3	3 1/8	+ 1/4	+8.6
O	TYMSHARE INC	14- 23	21	- 3/8	-1.7
A	UKS SYSTENS	4- 5	4 3/8	0	0.0
N	WYLY CORP	1- 2	1 1/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ACORESSOGRAPH-NULT	10- 15	13	- 3/8	-2.8
O	AUVANCED MENORY SYS	7- 9	7 5/8	+ 1/4	+3.3
N	AMPEX CCRP	8- 11	10 3/R	+ 1/4	+2.4
O	ANOEPSCN JACOBSON	3- 5	3 7/8	- 1/8	-3.1
N	APPLIED DIG DATA SYS	10- 17	17 1/8	+3 1/2	+25.6
C	BEEHIVE INT'L	8- 12	9 1/2	+ 3/4	+8.5
A	HOLT,BERANEK & NEW	7- 8	8	0	0.0
N	BUNKER-RANO	8- 12	11 5/8	- 1/8	-1.0
A	CALCCMP	3- 5	3	+ 1/8	+4.3
O	CAMBRIDGE MEMORIES	1- 3	2 1/4	0	0.0
N	CENTRONICS OATA CCMP	22- 29	29 1/4	+ 1/2	+1.7
C	CCGNITRGNICS	1- 1	1/2	0	0.0
C	CGMPUTCR COMMUN.	5- 6	6 5/8	+ 5/8	+10.4
C	CCMPUTER CCNSCLES	4- 7	4 1/4	- 1/8	-2.8
A	CCMPUTER EQUIPMENT	2- 3	2 7/8	+ 1/8	+4.5
A	CGMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
C	CCMIEN.	9- 13	9 7/8	- 5/8	-5.9
N	CONRAC CORP	19- 28	22 1/2	+ 5/8	+2.8

EXCN		PRICE 1977 RANGE (1)	CLOSE AUG 17 1977	WEEK NET CHNGE	WEEK PCT CNNGE
C	OATA ACCESS SYSTENS	4- 5	3 3/4	0	0.0
O	OAIA 100	6- 9	7 3/4	+ 1/2	+6.8
A	OATA PROOUCTS CORP	9- 15	14 5/8	+ 3/8	+2.6
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUN INC	1- 2	1 3/4	+ 1/8	+7.6
O	OECISION OATA CONPUT	2- 3	2 1/8	+ 1/8	+6.2
O	DELTA OATA SYSTEMS	1- 1	1/4	- 1/8	-33.3
N	ELECTRONIC N & N	4- 5	4	+ 3/8	+10.3
O	FABRI-TEK	1- 2	1	-	-5.9
O	GENERAL CCMPUTER SYS	0- 2	1 1/4	+ 1/8	+11.1
N	HAZELTINE CORP	9- 12	8 3/4	- 1/8	-1.4
N	HARRIS COPP	28- 39	34 7/8	- 1/2	-1.4
A	INCOTERM CORP	10- 15	10 1/2	+ 1/8	+1.2
O	INFGREX INC	4- 7	4 3/4	+ 1/4	+5.5
O	INFORMAIION INTL INC	9- 14	10	0	0.0
O	INTEL CORP	38- 57	50	+ 1/2	+1.0
A	LUNOY ELEC7RONICS	3- 6	4 1/4	0	0.0
O	MSI OATA CORP	6- 11	11 3/8	+1 1/4	+12.3
N	MOHAWK DATA SCI	5- 8	6	0	0.0
O	PENRIL CORP	2- 5	3 3/4	- 1/4	-6.2
A	PER7EC CORP	7- 9	8 1/8	+ 5/8	+8.3
A	PCTTER INSTRUNENT	2- 2	1 3/4	0	0.0
O	PRECISION INS7.	2- 2	1 1/2	0	0.0
O	QUAN7OR CORP	4- 5	3 7/8	- 1/8	-3.1
O	RECOGNITION EQUIP	6- 10	8	- 3/8	-4.4
O	SCAN OATA	1- 2	1 3/8	- 1/8	-8.3
O	STORAGE 7ECHNOLOGY	10- 16	15 3/4	+1	+6.7
O	T BAR INC	7- 12	12	- 3/8	-3.0
O	TALLY CORP.	4- 6	3 7/8	+ 1/9	+3.3
A	TEC INC	7- 10	7 1/4	- 1/2	-6.4
N	TEKTRONIX INC	29- 37	36 1/2	+ 3/8	+1.0
N	TELEX	2- 3	2 5/8	- 1/8	-4.5
C	WILTEK INC	1- 1	3/4	- 1/8	-14.2
	SUPPLIES & ACCESSORIES				
O	BALTINORE BUS FORMS	2- 4	1 7/8	0	0.0
A	BARRY WRIGN7	10- 14	13 1/2	- 1/4	-1.8
C	GYBERNA7ICS INC	1- 1	1 1/8	+ 1/8	+12.5
O	OUPLEX PRCOUCTS INC	14- 19	17 3/8	+ 1/4	+1.4
N	ENNIS BUS. FORNS	6- 7	6 1/8	0	0.0
C	GRAHAN NAGNETICS	11- 16	16 3/8	0	0.0
O	GRAPHIC CONTROLS	15- 18	16	0	0.0
N	3M COMPANY	48- 56	51 1/8	+1 3/8	+2.7
O	NCORE CORR LTO	26- 37	26 3/4	- 1/4	-0.9
N	NASNUA CORP	16- 25	24 1/2	+ 1/2	+2.0
O	STANOARO REGIS7ER	18- 25	21 1/2	0	0.0
O	TAB PROOUC7S CO	13- 19	17 1/2	+ 1/4	+1.4
N	UARCO	19- 22	20 1/2	0	0.0
A	WABASN NAGNETICS	10- 15	12 1/2	0	0.0
N	WALLACE BUS FORMS	17- 21	18 1/2	- 1/4	-1.3

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Survey Finds Minis Claim New Territory

By Esther Surden
CW Staff

NEWTON, Mass. — While minicomputers are not yet ready to take over the mainframes' world, more and more are infiltrating the large systems' territory.

Many large users have turned to minis as a solution to at least part of their DP workload, a recent CW survey found.

More than 220 users, representing about 800 minicomputers from 35 different vendors, responded [CW, July 4].

About one third of those who participated in the survey had multiple minicomputers in their shops or in remote company locations. About one fourth either used their minis in conjunction with a mainframe or along with time-sharing on a large system.

While the use of minis continues to spread to both large and small companies, software support remains the bane of the mini user's existence with over a quarter of those responding to the survey calling their vendor's support poor. Even many of those giving their vendors good ratings pointed out deficiencies in support. (See related story on Page 7).

CW Special Report on Minicomputers and Small Business Systems follows Page 34.

Users did not single out any particular vendor for their criticism, and critical arrows hit large and small vendors alike. Users who were disturbed about software support were very vocal in making this known. As one sophisticated user with approximately 85 minicomputers under his control noted, "mini vendors sell hardware; there is not

(Continued on Page 6)

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Groups Explore Change Needed In Federal DP

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A new federal agency is needed to consolidate government computer and communications procurement and management under one roof, according to several recommendations received by the President's reorganization team in the Office of Management and Budget (OMB).

This view, expressed by several computer industry associations and active individuals, contrasts with the view held by vendors such as IBM and Computer Sciences Corp. (CSC) and Rep. Jack Brooks (D-Texas) who have urged that federal oversight of agencies' computer and communications operations remain essentially what it has been for the last 12 years.

Oversight Divided

The existing structure, established in 1965 by the Brooks Act (P.L. 89-306), split DP oversight tasks among OMB, which is responsible for central and fiscal management review, the General Services Administration (GSA), which handles the acquisition of DP and communications equipment for most federal agencies; and the Department of Commerce, which houses in the National Bureau of Standards (NBS) the Institute for Computer Sciences and Technology — the standards-setting body in this field.

OMB has received "several hundred responses" as a result of its solicitation for comments from anyone interested in the management of federal DP resources [CW, July 11], a spokesman for the reorganization project said.

For the time being, comments from the federal agencies themselves are being treated as "advice to the President" and so are unavailable to the press and public, he added.

(Continued on Page 4)

10 Attacks Within a Year

DP Center Bombings Plague Italy

By E. Drake Lundell Jr.
CW Staff

MILAN, Italy — An armed terrorist group here has singled out corporate and state computer centers as targets for attack, bombing at least 10 such centers throughout Italy during the past 10 months.

The group, which has attacked only computer centers to date, calls itself the Unita Combattenti Communiste, which translates to the "Communist Combat Unit." In the past 10 months it has attacked three manufacturing companies, three chemical firms, two universities, an oil company and a local government office.

And while estimates are not available for all of the bombings at this time, the damage amounted to well over $5 million for the five cases where such figures were available — or a little over $1 million in damages per bombing.

This wave of political computer center bombings is apparently "unprecedented," according to Donn B. Parker, a computer crime expert from SRI International. Parker noted that in the past 10 months there have been more such cases in Italy than have occurred in the U.S. in the almost 20 years he has been keeping statistics on the subject.

A general theme in the communiques left by the groups after each bombing is that computers are "instruments of the capitalistic system" and therefore must be destroyed.

The attacks appear to be well coordinated and to be the work of a group that has "cells" or "cadres" in different parts of the country, according to European security forces.

The attacks are all run in a military style, they noted, and the comuniques issued after the bombings use military phrasing.

In each case, the attacks have taken a minimum amount of time with the terrorists apparently knowing exactly where to go within the computer center to do the maximum amount of damage, they added.

The group's first attack took place on May 26, 1976 in the public terminal room of the tax collection agency for the local government here.

In this case a large group — 15 men — entered the room carrying handguns and submachine guns. They threw 10 Molotov cocktails, eight of which ex-

(Continued on Page 5)

Court Orders New Trial For Greyhound vs. IBM

By Molly Upton
CW Staff

SAN FRANCISCO — Greyhound Computer Corp. will have a second chance to prove that IBM monopolized the computer leasing industry.

An appeals court here, after remaining silent for more than three years, overturned an earlier decision in the case that favored IBM and it ordered the matter retried.

The Greyhound case, filed in late 1969, was the first antitrust suit against IBM to go to trial, but the charges against IBM were dismissed by Judge Walter E. Craig in July 1972 before IBM presented its defense.

Craig ruled that the computer leasing company did not present enough evidence to support its charges that IBM monopolized the leasing market by restricting sales of its computer equipment.

Craig therefore entered a "directed verdict" in favor of IBM, even before that firm presented its defense before the six-person jury.

Greyhound appealed that decision in April 1974 and has been waiting since then for the decision of the Ninth Circuit Court of Appeals, which has now overturned Craig's ruling.

The appeals court, in a decision writ-

(Continued on Page 2)

N.Y. Halts Software Tax

By Molly Upton
CW Staff

ALBANY, N.Y. — New York State Tax Commissioner Thomas A. Lynch last week declared a moratorium on audits and assessments on DP software and services pending further consideration of the matter.

Following a hearing on taxation of the DP industry attended by a standing-room-only crowd of over 50 persons, Lynch and counselors Peter Crotty and Arnold Glass indicated they would refer the issue to the full three-man tax commission for possible formulation of new regulations.

At the end of the hearing, Lynch stated that the commission will consider the matter at its next meeting in October.

Lynch instructed those present to remit to the state any sales taxes they had already collected from customers. However, he did not indicate what course of action DP firms should take in the interim, observed Sandy Goldberg of Roberts & Holland, attorney for the Association of Data Processing Service Organizations (Adapso). Goldberg surmised one should continue collecting the taxes.

(Continued on Page 6)

COMPUTERWORLD
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IBM Antitrust Suits Boiling Again

By Molly Upton
CW Staff

SAN FRANCISCO — The recent Ninth Circuit Court ruling throwing the Greyhound Computer Corp. vs. IBM antitrust case back into the courts adds one more ingredient to what may prove to be a boiling pot for IBM.

IBM has Cravath, Swaine & Moore attorneys actively engaged in the U.S. trial and hanging on the line in the event that the case of California Computer Products, Inc. vs. IBM comes back to life as Greyhound did.

As in the Greyhound case, IBM received a directed verdict in the Calcomp suit against it.

Meanwhile, IBM is already busy defending itself on the West Coast in the recently opened trial of a suit filed by Forro Precision, Inc.

This, even before the scheduled January opening of the Memorex vs. IBM antitrust case.

The law firm retained by IBM for the Memorex action, O'Melveny & Myers of Los Angeles, is also handling its defense against Forro.

Forro, a disk drive components manufacturer, file the suit in 1974 after IBM had the instrument maker's plant searched as part of its research into alleged thefts of disk drive trade secrets by former employees of IBM's San Jose facility.

$36 Million Sought

Forro seeks $36 million in treble damages on antitrust grounds and also charges IBM with seizing its records and trying to put it out of business.

IBM's $25-million counterclaim alleging unlawful market presence and misappropriation of trade secrets is also part of the jury trial which is expected to last until October.

Speaking for IBM, attorney Henry C. Thumann said, "Far from showing any damage to Forro from the activities of IBM the evidence in this case is going to show unjust, unlawful profits enjoyed by Forro Precision through its exploitation of IBM technology and IBM specifications, which it knew [were] obtained unlawfully in violation of the rights of IBM."

Forro attorney Joseph A. Alioto said evidence will show "the effort made by IBM to infiltrate Forro and find out as much information as they could about Forro and, by reason of that information, about IBM's peripheral competitors, information they knew they could not otherwise get in the marketplace itself."

Alioto charged that in 1970 IBM hired a man to "get into Forro and find out what Forro had, find out what its production was, find out who its customers were, prices and things like that."

Greyhound vs. IBM, Act 2

(Continued from Page 1)

ten by Justices Browning, Wallace and Moore (who normally sits on the Second District Appeals Court in New York), said the trial should have been allowed to run its course because the jury could have found that leasing general-purpose computers for commercial applications could have constituted a relevant market for antitrust purposes.

The decision also found evidence in the record "from which the jury could reasonbly infer that IBM possessed monopoly power in the leasing of general-purpose commercial computers."

The court, the ruling continued, is "bound to view the evidence in the light most favorable to [Greyhound] and to give it the benefit of all inferences which the evidence fairly supports, even though contrary inferences might reasonably be drawn.

"The jury [also] could have concluded that IBM maintained its monopoly power in the leasing of general-purpose computers in part by practices that unnecessarily, even deliberately, excluded leasing companies from an opportunity to compete," the ruling said.

Further, "Greyhound offered direct evidence to prove that the conduct complained of did occur and that it restricted the competition of leasing companies in the leasing market, in which IBM possessed monopoly power," the appeals court stated.

"This was sufficient to establish the prima facie case. Greyhound wasn't required to prove the source of IBM's power to do what Greyhound's evidence indicated IBM in fact did," the court ruled.

An IBM spokesman contacted last week stated: "We are confident that given the opportunity to present our case we will prevail on the merits."

IBM Strategy

Greyhound contended IBM sought to make the purchase of computer equipment by lessors economically unattractive through the use of the fixed-term plan, discontinuance of technological discounts, increase of the lease/purchase ratio and unbundling.

The appeals court found Greyhound failed to prove the fixed term plan was not a reasonable response to competition. But it indicated the jury could have found the other actions either intentionally or effectively anticompetitive.

Original Decision

In the original decision, Judge Craig had ruled the evidence was "insufficient" to establish a relevant market and IBM's share of the market.

In addition "the evidence was insufficient to establish IBM's control of a market."

Furthermore, "the share of any market IBM holds has been achieved as a result of superior skill, foresight and industry," Craig had ruled.

According to the original ruling, "IBM's activity of which Greyhound complains was a competitive response to economic factors over which IBM had no control; and "Greyhound's damages were 'purely speculative.' "

The appeals court also took time to refute certain of IBM's arguments.

The appeals court let stand Judge Craig's finding that IBM had not breached an obligation to provide services to Greyhound's lessees who were first users of the machines and it ordered the rest of the case back to trial.

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3	Exxon
4	IBM
5	Ford Motor
6	Mobil
7	General Electric
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9	Standard Oil (Calif.)
10	Texaco
11	Gulf Oil
12	Shell Oil
13	Sears, Roebuck
14	Eastman Kodak
15	Dow Chemical

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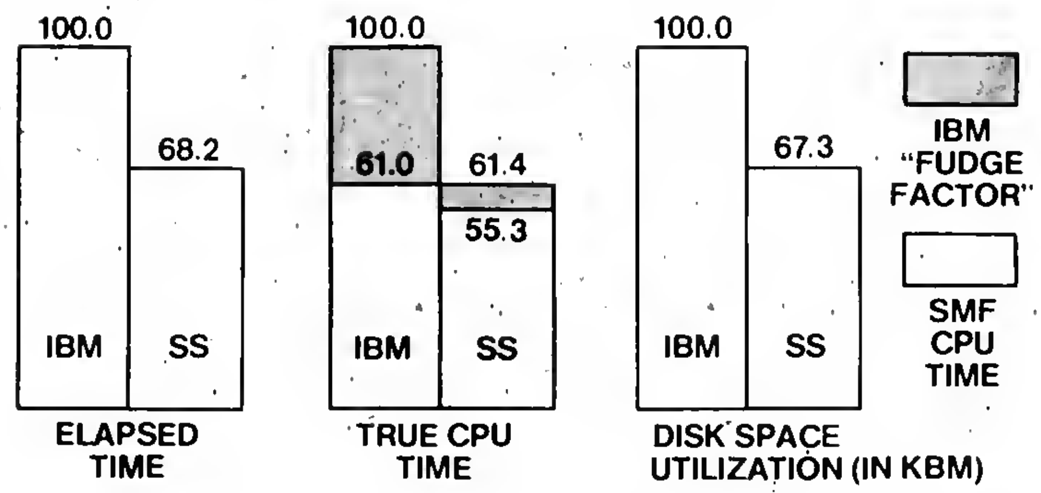

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Federal DP Needs Consolidation, Observers Say

(Continued from Page 1)

The request for public comments on the issues OMB has identified in the federal DP and communications areas is one of the first steps in the reorganization of federal data processing. OMB hopes to give its final recommendations to President Carter within 10 to 12 months, the spokesman stated.

Afips Panel

Representing its member associations, the American Federation of Information Processing Societies (Afips) set up a panel to develop recommendations. That panel determined that while OMB "should continue to provide government-wide enforcement" through fiscal control, an independent agency should be established whose "sole mission" would be responsibility for all federal DP and communications procurement and management.

Afips envisions such an agency as having authority over all other agencies in management policy, procurement, technical support and standards development and implementation.

The agency, which would thus consolidate the functions now performed by OMB, GSA and NBS under the Brooks act, would also perform long-range planning of DP and communications operations as part of the regular budget cycle, according to the Afips scheme. Agencies would undergo "mandatory periodical total system performance evaluation and analysis" by this organization as well.

The independent body would maintain an inventory of well-documented software packages with information on their performance and provide technical consultants to other agencies, Afips stated.

Finally, the agency would make recommendations to the Civil Service commission regarding adequate job categorization. A particular emphasis would be placed on software personnel and the provision of adequate continuing education to enable federal personnel to keep abreast of technological change, Afips said.

The Computer & Communications Industry Association (CCIA) would consolidate the present Brooks Act functions under one organization, too, but that organization would have a different focus. The CCIA would place GSA and NBS within OMB, strengthen OMB by providing it with "a realistic five- to 10-year long-range planning capability," and elevate the management and budget agency to a cabinet-level position.

"All of the centralized procurement functions now scattered among GSA, OMB and NBS would logically fall within the scope of this single agency as ADP is, afterall, a management tool," the association wrote to OMB. It suggested that the "single agency" might be called the "Department of Planning and Management."

"Any reorganization in the federal ADP arena must begin with a renewed commitment toward standardization of ADP equipment," the CCIA added.

Grosch's Response

Speaking as "a Brooks Bill veteran" and as "a computer pioneer" rather than as president of the Association for Computing Machinery (ACM) or as a member of the Afips panel, Herbert R.J. Grosch recommended that any central authority the reorganization project decides to put together "must be predominantly technical.'"

These people need not be "chip designers or laser physicists," Grosch wrote, but if they are unable to easily cope with extreme technological innovation "used against them as a weapon by IBM and the other suppliers and by the fancier agencies," the organization "will be outflanked daily."

While the Commerce Department might be a good temporary home for such a body, Grosch would like to see it become independent eventually — along the lines of the central computer agency in Great Britain or the Swedish statskontoret.

"There is absolutely no hope for rapid or significant progress in DP standards in the U.S. until Cbema [the Computer and Business Equipment Manufacturer's Association] is taken out of the circuit," Grosch said, noting that Ansi's X3 committee is currently "operated" by the association.

While Grosch and Cbema clearly clash over this issue, they are in agreement in wanting to see the federal agencies' procurement of DP and communications equipment speeded up.

Need for Clarity

Cbema and several vendors expressed the need for clearer regulations in the area of equipment acquisition. IBM offered to share its planning and management techniques.

The computer industy leader also told OMB it "supports the separation of ADP policy and procurement responsibilities which currently exists between OMB and GSA."

IBM further stated its belief that the DP and communications equipment the federal government now has is behind the state-of-the-art and behind that of most other users.

Rep. Brooks interprets federal agency complaints that procurement takes too long as efforts to undermine the Brooks Act. In a memo to OMB, he expressed his belief in the system as established by the act, suggesting that the oversight agencies — OMB, GSA and Commerce — are at fault for not enforcing it.

"Without a firm commitment by OMB, GSA and Commerce to eliminate the historical barriers between these agencies and without the establishment of effective centralized ADP management in each agency, little hope exists that the government will be able to effectively manage and control its ADP resources," Brooks wrote.

To strengthen centralized DP management in the executive agencies as well as the oversight roles of OMB, GSA and Commerce, the congressman suggested greater support and funding be given to the federal government's software conversion program with a view toward limiting interim system upgrades.

The reorganization project is currently evaluating the comments submitted to it. In October, task forces will be organized and assigned to study such areas as procurement, standards and career development for DP and communications, the spokesman said.

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Rash of Bombings Plagues DP Installations in Italy

(Continued from Page 1)

ploded, destroying eight of the 70 IBM 2740 terminals installed in the area. The center was down for a day and a half after the attack.

Then on Oct. 13, 1976, the second commando attack took place. This time, plastic explosives destroyed an unidentified computer system at De Angeli, a pharmaceutical company here.

A more documented action took place on Dec. 19, 1976 at Data-Montedison, an in-house service bureau for the huge Montedison conglomerate.

In this case, three men and one woman, carrying a large package approached the plant's security guards and told them they wanted to leave a present for a coworker.

The guards opened the gate to the plant, at which time the terrorists overpowered them and forced them to open the computer center. The terrorists went immediately to the communications controller in the center, doused it with gasoline and ignited it.

Immediately after this attack in Milan, three armed men in Rome — 500 to 600 miles away — forced their way into a private radio station and forced the radio personnel to read a statement defending the bombing. This led security personnel here to the conclusion that they were dealing with a nationwide organization.

Steel Plant

The next assault took place on Jan. 17, 1977, when the group planted a bomb above an IBM 370/135 computer at Sias, a steel manufacturing company here. The bomb broke through a bulletproof glass panel and did about $30,000 in damage to the center.

Immediately after this bombing the Sias DP manager was given permission to buy fireproof safes for his tapes — a long-standing request that had been previously denied by management.

The next case came on April 15, when a production control system was destroyed at Liquichimica, a petrochemical company in Saline Ioniche, Calabria. The four attackers again carried hand and submachine guns and doused the computer with gasoline, resulting in damage of about $1 milllion.

University Next

Then in April 21, two masked men and a woman forced their way into an intelligent terminal center at the University of Bocconi here and used explosives to blow up the center. The communique from this bombing, left in San Marco Church here, said the university was a center for the training of high-level executives "that will join the capitalistic forces" in the future.

The bombings prove the small teams of guerillas can attack the capitalists, the communique added.

The next major guerrilla move came on June 10, when three women broke into the computer center at the University of Rome and destroyed a Univac 1110 worth more than $4 million.

The women were armed with submachine guns and hand guns. They held the guards hostage while they evacuated the computer center, then covered the CPU with gasoline and ignited it. The action seemed well timed to catch the evening news and was prominently featured on Italian TV that night.

Three Other Attacks

Security personnel in Europe said there were at least three other attacks claimed by the group, but they would not publicly identify the companies involved except to say that one was an oil company and the other two involved manufacturing companies.

In addition to those attacks on computer centers, IBM and Honeywell Information Systems offices in Italy have also been the subject of terrorist attacks, the security men indicated.

'It Could Happen Here'

MENLO PARK, Calif. — Terrorist attacks on computer centers like those now taking place in Italy "could happen here," a noted computer crime consultant here indicated last week.

Donn Parker, a researcher with SRI Inc. (formerly Stanford Research Institute), warned that the U.S. Department of Justice has indicated there may be a step-up of terrorist activity in this country and indicated such activity could be directed toward computer centers.

Parker, who has studied computer crime for almost two decades, said "we have no history of any related attacks of this size" anywhere in the world.

In the late 1960s, he said, computer centers were targets of several bombings related to the antiwar movement, but since 1971 there have been almost no such attacks.

The Italian computer center attacks show we are "entering the era of high-technology terrorism," according to Wallace S. Bruschweiler, director of international operations for Data Security Holding, Inc.

And, he admitted ruefully, there is little that can be done to stop attacks like the 10 that have recently taken place in Italy.

While a computer center can, and should, set up fairly rigid access controls it is difficult to stop terrorists armed with submachine guns from pushing their way in, he indicated.

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Minis Moving Into Large Systems Domain

(Continued from Page 1)

much concern for software".

An overwhelming majority of those who replied used their small systems for multiple applications, and most of the respondees preferred to do their own programming rather than get a turnkey system or outside help.

Selection Criteria

Price/performance ranked as the No. 1 criterion users gave for choosing their particular mini system, while software capability and vendor reputation were close behind. Many readers gave a combination of these factors as the reason for choosing their systems, while others mentioned vendor proximity, the vendor's ability to provide remote maintenance and good field service organization or a low bid.

Over 90% of the users rated their hardware maintenance service either good or excellent, and a majority called their maintenance service excellent. Several readers said they did their own maintenance.

As to what users will do when they outgrow their present systems, many stated they either did not expect to outgrow their systems or that an upgrade (adding more disk, another terminal, more memory) would take care of their growing pains for the foreseeable future.

Over half of those responding indicated that their next course of action would be to get a larger mini when their present system becomes overloaded. The second most popular answer was to "offload the system with another small system."

Purchase Decision

The area of the most diversity among those who returned the survey was the matter of who makes the final purchasing decision with respect to minicomputers. Although a central DP department was cited most often as having the final word on system purchases, many users said that a combination of the end-user department, central purchasing department and central DP department came up with the final go-ahead.

Some smaller users noted that top management, managing partners or the president had the final word, while some larger users followed a more complex and well-defined procedure.

In general, users seemed pleased with their small systems, as evidenced by their willingness to stay with minis when their present systems were "outgrown." Very few users chose the alternative of growing into a mainframe when they looked to the future.

Although most users were not as vocal as a coordinator of computer services of a junior college in Massachusetts who said "minis will eventually replace almost all mainframes," many did express their commitment to the small systems in various ways.

Minis 'Underated'

An IBM 5100 user said "minis are underrated as a good solution to the problems of smaller businesses," and a DP manager for a Seattle company noted "transaction-oriented minis are great. They give users control of their systems and the price/performance is outstanding."

Of all those who took the time to reply to the survey there was only one detractor. "We feel distributed processing is a big mistake," this user of several mnis noted. The firm said that when its distributed system is outgrown, the firm will "go on-line to a mainframe."

People with "low education, low literacy and low management skills at remote locations cannot run a small terminal, much less a small computer system," this user added.

N.Y. Halts Software Tax

(Continued from Page 1)

The state will continue to mail out "desk audits," or questionnaries, according to observers, but will cease sending auditors for on-site work.

Presentations by several industry members succeeded in removing the mystique from data processing by succinctly outlining the various aspects of programming, systems analysis and contract programming and explaining the differences and similarities between time-sharing and batch services, observers indicated.

In addition, both David Campbell, vice-president of the Computer Task Group, a Buffalo firm, and Rhoda Minowitz of Queens Data Processing described their plights caused by the assessment of taxes for past years.

Borders on 'Immoral'

Commissioner Lynch agreed with Campbell that his situation, in which the assessment exceeds the net value of his firm, "borders on the immoral."

Miniowitz indicated a $90,000 assessment rendered her unable to sell her business. "How can you buy a business with a $90,000 liability?" she asked.

The Data Processing Management Association (DPMA) was represented by Robert Sherin, president of Nova Computing Services, Inc., and speakers for Adapso were attorney Goldberg, Al Eisenstat; general counsel of Tymshare, Inc. and David Campbell.

Not Quite Right

Jerry Dreyer, executive vice-president of Adapso, called the meeting "excellent" and observed that the moratorium may indicate the state feels something is not quite right with its taxing policies.

The state representatives seemed "very sympathetic to the problem of retroactivity." They also indicated a tendency to view DP as producing a personal service rather than a tangible piece of property, Dreyer observed.

Adapso will once again place high priority on efforts to draft model legislation concerning taxing DP services and software, according to Dreyer.

Cannot Escape

He also said he is not so naive as to believe the industry can escape taxation completely. However, he said what is needed is equitable taxation — the DP industry should be treated in the same manner as other fields, such as accounting.

After the meeting, Lynch invited Adapso representatives to return within a month for another meeting, Dreyer said.

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In Survey of 220 Sites

Mini Users Found Critical of Software Support

By Esther Surden
CW Staff

NEWTON, Mass. — Users responding to a recent CW survey had a lot to say about the software support available for their minicomputes — most of it critical.

The survey of over 220 users representing over 800 minicomputers revealed that software support for minis is at best spotty and that levels of support vary from location to location.

Although 75% of users rated their software support as either good or excellent, many of those who called their vendors' support good pointed to problems yet to be solved.

A common complaint was that the vendor had no local software support or the support available was spread too thin. Poorly trained software personnel and software. that was delivered full of bugs were also frequently cited.

No particuar vendor was the target of the criticism. Users praised or complained about large and small vendors alike, including those noted for their user support reputation.

Digital Equipment Corp. came in for its share of criticism from a user who complained of "no commitment to the PDP-8 community." A PDP-11 user was even more vocal, saying that "lousy design, poor language (Basic-Plus) and excuses" characterized his software service.

On the other hand, a DP manager for a Colorado company was pleased with the software support DEC offered and praised the vendor's "involvement and interest."

Criticism of IBM

Even IBM with its reputation for user support received some criticism. An IBM 3/10 user noted that he "purchased an industry application program and the local people were not familar with it."

An IBM 3/12 user said "IBM is no longer playing a major role in support," and still another 3/10 user said "the systems people aren't aware of changes."

In general, however, most users called IBM's support excellent.

A user of both Hewlett-Packard and Digital Equipment Corp. equipment noted there was "no local software support" for his systems. A U.S. government user of HP equipment complained that that "vendor's customer engineers are hardware-oriented, not backed by software support personnel."

A user satisfied with HP's software support appreciated the fact that "software updates" were available "at low cost."

A Peoria, Ill. user of HP, DG and Computer Automation, Inc. minis said that both support and maintenance for his systems were excellent. He pointed to "fast response and willingness to work long hours to find problems" as evidence of this and said that vendor's representatives are always available for questions.

A DG user at a junior college called his support good but "technical manuals are terribly written." The people "are pretty sharp," however, this user stated.

Another user of DG Corp. equipment rated software support as lacking. "Problems with RDOS and DG Basic set back our software house severely, resulting in significant delays in delivery. Fifteen months later, DG adopted TAC-Basic," the DP manager noted. Another DG user said that the software support he received from the vendor was good as the result of "a field-proven operating system and languages including Algol, Fortran and Basic."

'Some of the Worst'

A user in an engineering research company said "Interdata has some of the worst software I have every seen" in response to the software support question. Another Interdata user complained that "they have not provided what they promised" in the software area.

A disappointed Datapoint user said the vendor "is unable to fulfill our technical needs without failures," and a Chicago consulting firm said that sometimes "they know less than we do." Other users rated Datapoint's support as good.

NCR's staff is small and "poorly trained," according to one NCR 101 user, while another user of 34 minis from that vendor said the service and support he has received have been excellent. However, NCR 399's "programs are unwieldy and require excessive computer time," a government user stated.

A Burroughs user rated the vendor's hardware maintenance as good, although the "adequate talent sometimes lacks depth and quick response." He said that software support was poor because the vendor was "seldom willing to accept blame" for malfunctioning software.

Because the vendor "supplied canned software free of charge," a Boston Wang Laboratories 2200 C user was very pleased with the software support and a hospital user of the Jacquard J-100 small business system with multiple terminals called the software support he receives from that vendor "excellent."

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System Helping AMC 'Americanize' Engine

DETROIT — The Americanization of a German four-cylinder engine for American Motors Corp. is getting a major assist from a U.S.-built computer.

Recently AMC purchased a complete engine manufacturing plant from VW-Audi, the West German auto producer. However; the facility's machinery and 4,000 drawings for assembly and operation were designed to metric standards and used European electrical systems that operate on different current from those normally used in the U.S.

AMC engineers and DP staff members developed a computer program to speed conversion of the drawings and assembly specifications from the West German standards to those applicable for U.S. operations. Their program runs on a Honeywell large-scale dual Model 66/60 system at the corporate information service center here.

From Richmond, Ind., where the new equipment is being installed, an engineer creates a file on a particular part or circuit using one of 60 electrical symbols stored in the host computer's 512K words of main memory. Another symbol indicates whether the circuit is in series or parallel.

Using a Tektronix CRT, the engineer interfaces "on-line with the Honeywell host over a dial-up, 1,200 bit/sec asynchronous line with synchronous modems at both ends. In the data center, a Calcomp 936 printer produces a rewired schematic complete with interconnections and parts cross-references.

"The part and specifications are added to the data base, a tape is produced and the plotter prepares the finished drawing," according to Joseph W. Balnave, AMC director of the corporate information service center.

"It is then available for recall, update or reference whenever needed; meanwhile, the finished drawings are relayed to Richmond in a one-hour turnaround.

"Previous methods took up to six hours to convert a simple diagram to American standards," Balnave said.

Included with the dual Model 66/60 system is a Datanet 6632 front-end network processor that coordinates communications over 20 lines to AMC sites in the Midwest and East, 10 dual-density Honeywell disk units, eight tape units and two 1,200 line/min printers. Nineteen Honeywell 7700 Series VIP terminals are used in AMC engineering and manufacturing centers.

The Honeywell computers were installed in November 1976 to replace a Honeywell Model 635 and will soon assume current loads running on an IBM 370/145.

To manage the engine's conversion program data base, AMC uses Honeywell's Integrated Data Store/II data base manager. The Transaction Processing Executive software package handles terminal-to-host instructions, while the Network Processing Supervisor drives the Datanet 6632.

ACM '77 Set For Seattle Oct. 17-19

SEATTLE — The Association for Computing Machinery will hold its annual conference — ACM '77 — here Oct. 17-19 at the Olympic Hotel.

In-depth sessions will be offered in areas such as data bases and software engineering, computer graphics, computer-aided-instruction and hardware architecture — for minis, micros and mainframes.

Other sessions will explore computer personnel turnover, the Freedom of Information Act, a data base standardization report and long-range computer planning.

Registration forms and further infomation on the conference and its technical program are available from Harvey Z. Kriloff, technical program chairman at (206) 773-0567 — or James S. Ketchel, general chairman, at (206) 623-4987 or (206) 935-6776.

For information on the exhibits contact Michael Rose at (206) 235-3022 or Lawrence Gaylord, special events chairman, at (206) 655-8892.

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Rather Than 'After the Fact'

DP Audit Role Seen Needed Early in Projects

By Frank Vaughan
CW Staff

HOUSTON — DP auditors should become involved with systems while they are under development, rather than "after the fact," especially since most management has stopped looking at the audit function as a review of historical events.

Michael I. Sobol, DP audit supervisor for the Gillette Co. in Boston, made that observation to a recent gathering of the EDP Auditors Association here.

Another reason for auditors' involvement during development is that it is less costly to develop controls up front than to go in after the fact.

In addition, systems development people are less sensitive to audit involvement, and proper "hooks" can be designed and built into the system to reduce audit involvement and time in future system audits. These "hooks" may include special audit reports, special control totals or an integrated testing facility, he explained.

Auditors who are going to be involved with systems under development must have a formal written statement of audit responsibility. A verbal expression of management support is not enough, Sobol said.

Communications is extremely important, he noted. Auditors must be provided with immediate and long-range plans, status reports and other important information. Verbal responses in many areas are insufficient and DP managers should expect requests for formal communications.

It is especially helpful if the auditor is allowed to review the DP department's correspondence file and is placed on the distribution list for project correspondence, he suggested.

Total Involvement

At project initiation, the audit interface is limited. The project initiation report should be reviewed for informational purposes on all high-risk projects and selected medium-risk projects.

When the project reaches the business proposal stage, the problem specification report should be examined for all high-risk and certain medium-risk projects. The audit response at this point should involve limited comments on control features that should be included in the system design report, he said.

The main audit concern during the detailed systems design phase of the project should be with the design of the security and control features. Depending upon the system risk, involvement may vary from total participation on a high-risk project to general controls review for low-risk systems.

During the programming stage of the project, the auditor may be required to spend 25% to 40% of his total time expenditure on the project. Involvement is required in program testing and review, systems testing and review and conversion control.

Parallel Implementation

Following successful system testing, data center implementation and user implementation usually proceed in parallel, Sobol said. The auditor is primarily concerned with the adequacy and completeness of the operational documentation and systems documentation.

He will also want to make certain that user departments receive proper education and training.

The auditor does not usually take part in the final project reviews, but should receive a copy of the final report.

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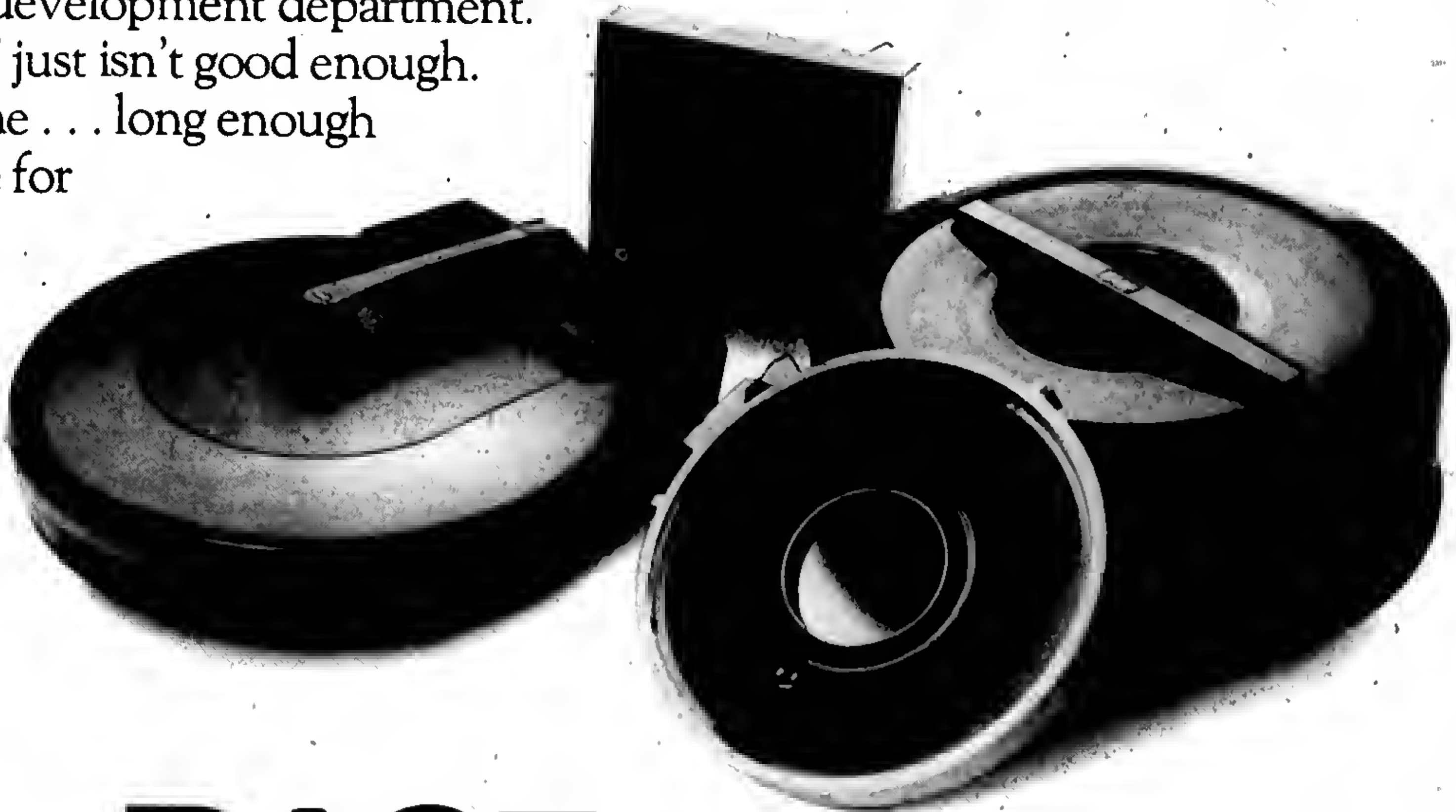

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Data Control Seen as Basic Management Goal

By Molly Upton
CW Staff

TORONTO — Maturity in data processing will be reached when "management is as comfortable with managing data resources as with managing money or material resources," according to a paper prepared by Richard L. Nolan of the Harvard Business School.

First, however, management must focus on managing data rather than concentrating solely on the CPU and related hardware, Nolan said in his paper, presented at the International Federation for Information Processing (Ifip) Congress 77 here recently.

The paper presented a starting point for a panel discussion on ways to implement the concept of data resource management. Some of these ways include a charge-back system based on a value-added concept, implementation of data base technology, implementation of data administration functions and the dispersal of functional analysts and programmers into user departments, according to Nolan's paper.

Nolan expanded from four to six the various stages of DP management, from the inception of DP to maturity, to reflect the assimulation of data base technology. The first four stages involve building applications, the DP organization, DP management planning and control and developing user awareness.

With data bases facilitating the separation of data from individual programs, the DP department can manage the data resources of the firm and the user/managers can manage the functions, such as processing and payroll, the paper indicated.

Prediction for 1980

Nolan predicted that by 1980 three types of computers will comprise the typical DP installation: a data machine, a processing machine and a control machine.

The data machine will handle management of the organization's data and will be linked with the data bases. The processing unit will perform value-added functions of "combining, mutating and distributing data to produce information," the paper said.

The control machine will provide accounting, scheduling and monitoring as well as billing.

To accompany the changing technology, the organization structure will include a senior executive, probably a vice-president, with two line functions of data administration and data processing. The latter will be similar to current sophisticated operations activities, but functional systems analysts and programmers will work with the user departments to develop programs that reflect the user's needs, the paper said.

In a brief explanation of the chargeback scheme, Nolan's paper indicated users would be charged for the cost of the data plus the value-added services of processing it.

Walter Carlson, corporate marketing consultant for IBM, expressed skepticism that the DP installation would be as Nolan described it by 1980; he said, perhaps it will be within 10 years.

He agreed the real question is how long it will take people to realize DP revolves around data rather than the CPU.

Through a statistical analysis of customer records, IBM has deduced that a small sample is arriving at Nolan's fifth and sixth stages, and an even smaller fraction is going toward greater end-user involvement in the shape of distributed processing.

Carlson asked how Nolan is going to explain that phenomenon.

Although he agreed with the concept of charge-back for data on a value-added basis, he warned this should not be left to accountants. Such an intangible subject as data, which can be possessed simultaneously by more than one entity, will "drive accountants up the wall," he said.

Perhaps some dramatic proposal — such as the DP department paying a price for the data it uses and charging customers for the data it delivers — should be suggested in order to start the use of this scheme. Possibly one could estimete the latter charge by calculating the expense that would be incurred by the using department if the DP department didn't exist and dividing that sum by some number, he suggested.

Carlson would place the DP resources controller outside of the DP department and under the corporate controller or in each of the firm's profit centers.

The proposal for a DP resources controller is "the key to making the DP department an efficient and respected partner in corporate goals," he said, urging experimentation with the concept.

Irwin Sitkin, vice-president of corporate DP at Aetna Life and Casualty, commented there will be more stages of growth. Perhaps there are four rather than six, with the four being repeated. "It's not important how many stages there are, but you do need a feeling for where you are," he said.

Aetna has been shifting emphasis from managing hardware to managing data, he said.

Samuel Kahn, manager of the information system department at E.I. DuPont, said he felt corporate management had been allowed to abdicate the responsibility of managing DP. "We have failed to convey the idea that DP is a technology that can be managed like any other technology," he said.

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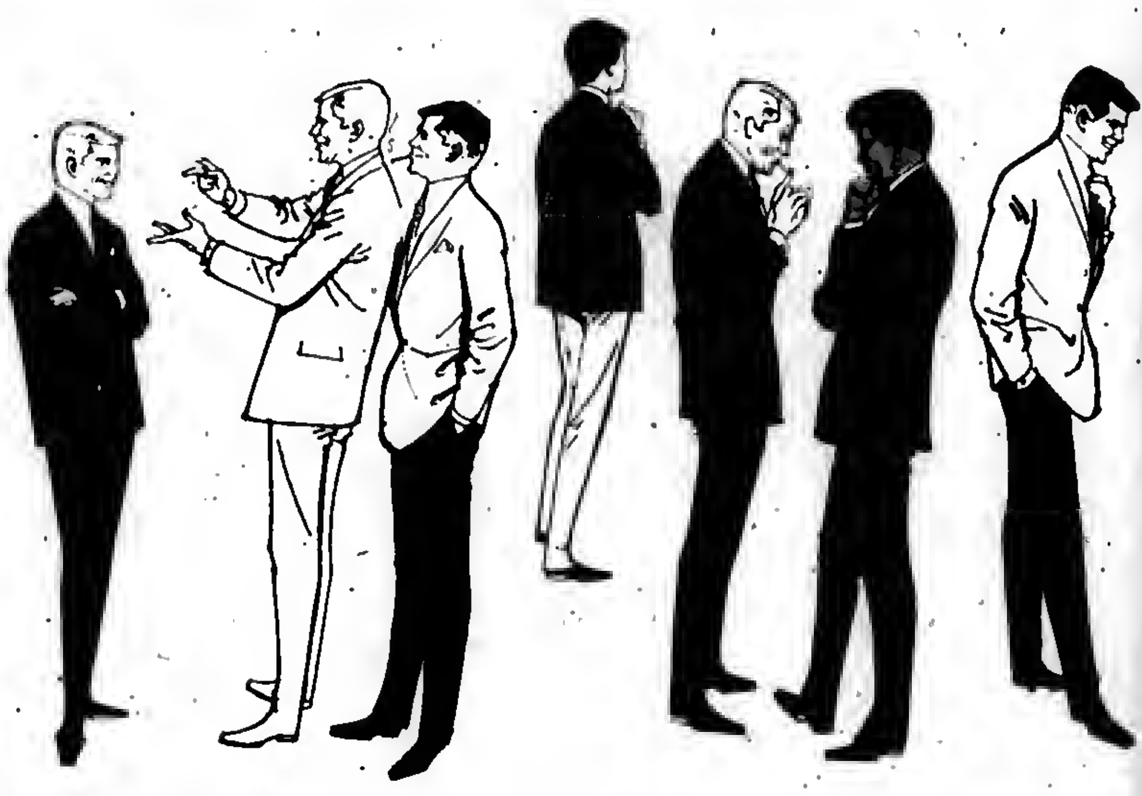

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Pinpoints Partner Attitudes

Word-Analysis System Examines Marital Flaws

By Jeffry Beeler
CW Staff

DES MOINES, Iowa — If your marriage is on the rocks or just heading that way, perhaps you can get the expert counseling you and your spouse need from a series of computerized word analysis programs.

Dubbed the Marital Climate Inventory (MCI), the three programs help marriage counselors and professionals in related fields pinpoint the source of problems in husband-wife relationships, according to Dr. Charles Cleveland, president of Grey Matter here, which developed the programs. Grey Matter also uses the programs to counsel engaged couples, Cleveland added.

The programs analyze troubled marriages by asking husbands and wives to answer 58 open-ended questions dealing with nine topics — love, sex, money, relatives, communication, religion, selfishness, children and freedom. A Control Data Corp. 415 keypunch unit is used to convert the results usually totaling about 1,000 words) into machine-readable text, which a 49K-byte CDC 6400 scans and compares against a computer-stored lexicon of 15,000 frequently used English words.

Interpreting each word in the responses, a Grey Matter program identifies the main attitudes characterizing the couples' relationships and reports its finding on 10-page printouts.

With their knowledge of how certain attitudes correspond to various degrees of marital harmony, Cleveland and his colleagues can then assess the emotional health of their clients' relationships and spot major flaws.

Field Tests

In field tests at the University of Iowa, Grey Matter's computerized diagnoses agreeed 91% of the time with the independent findings of three practicing marriage counselors, Cleveland claimed.

Besides marriage counselors, typical customers of Grey Matter's word-analysis programs include clinicians, physicians, lawyers and the clergy.

The programs particularly benefit clinicians, Cleveland says, by allowing them to diagnose marital ills after only one or two meetings with their clients. This is important because couples seeking marriage advice frequently become discontent and discontinue their counseling if clinicians do not quickly identify the cause of their domestic woes, he explained.

In addition to the other hardware modules, Grey Matter's configuration incorporates a Cyber 74 mainframe, a CDC 844 disk drive, a CDC 501 printer and a CDC 604 tape drive.

ICCP Extends CCP Deadline

CHICAGO — The deadline for registering for the Certificate in Computer Programming (CCP) examination has been extended from Aug. 31 to Sept. 15.

The examination, which is being offered by the Institute for Certification of Computer Professionals (ICCP), is being given on Oct. 22 in over 100 colleges, universities and test centers around the world.

Study guides for the examination may be obtained from ICCP's New York Office at 304 E. 45th St., New York, N.Y. 10017.

Register Now For CDP Exam

CHICAGO — The Institute for Certification of Computer Professionals (ICCP) has begun accepting registrations for the Certificate in Data Processing exam, slated to be administered on Feb. 18.

Applicants will automatically receive a study guide containing a new outline for the test. Applications and fees must be submitted to the ICCP by Dec. 15.

Send requests for applications to 304 E. 45th St., New York, N.Y. 10017.

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Editorials

First Things First

The governmental stamp of authenticity has descended on the information industry with a dull thud.

Confirming what members of the DP community have known for a long time, a Department of Commerce report claimed that the total "information sector" accounted for 46% of the U.S. Gross National Product [CW, Aug. 22].

What makes the percentage more impressive is the fact that it was based on 1967 statistics. Without doubt, this figure has grown in the last 10 years.

Recognizing that the U.S. is moving from an industrial society to an information society, the Office of Telecommunications report calls on the executive branch to formulate a national information policy. Part of this policy would be to "adopt a prospective look at future applications of information technology," the report said.

The implications of a national information policy include the use of information (and the the ability to convey that information) as an instrument, perhaps, in international diplomacy. A rudimentary beginning to this type of information use may lie in the standards struggles now associated with the interconnection of national public data networks on an international scale.

The unfortunate part of such forward thinking is that the global issues are surfacing before the primary issues have been addressed. A society that has not yet decided how it can guarantee individual privacy against the onslaught of ever-enlarging data bases is now called upon to formulate information policy.

There is no doubt that the ability to gather and process data will become increasingly important in the years to come. It is probably inevitable that nations which become sophisticated in manipulating and moving this information will have a significant power.

But a national policy for dealing with information will be successful only after the rights of the individual have been ensured against unwarranted intrusions into personal data.

A society dedicated to the use of information for the common good should not hesitate to limit the uses of data gathered from the private sector.

No Easy Answers

The computerization of a job may have a dehumanizing influence on the worker. This was one of the findings presented at a session on job satisfaction and computers at the recent Ifip Congress.

It is not surprising that workers feel less in control when their jobs become automated. But this means there is more to achieving worker efficiency than simply installing a computer.

One of the panelists at the session told of bank tellers who no longer considered themselves "bankers" after they began to work with an automated system.

There are no easy answers to these types of peripheral problems.

It is hard to argue that computers should be used sparingly and only when they do not dehumanize the workers involved.

Some type of management assurance might have to be given that the machine will never replace the reasoning power of the worker.

In some cases, problems have been avoided by involving the workers who will be using the system in helping to design it.

There has been much discussion in the past of whether computers actually replace people. Perhaps the real issue all along has been whether the computer leads the worker to assume the role of a disinterested onlooker.

Data Past

Five Years Ago
Aug. 30, 1972

BETHESDA, Md. — A government advisory committee was told here that it might be too late to stop the trend toward the use of the Social Security number (SSN) as a universal identifier.

While no conclusions were reached, witnesses before the committee, formed by Secretary Elliott Richardson of the Department of Health, Education and Welfare, described planned or already-implemented computer files with the SSN as chief file access.

— — —

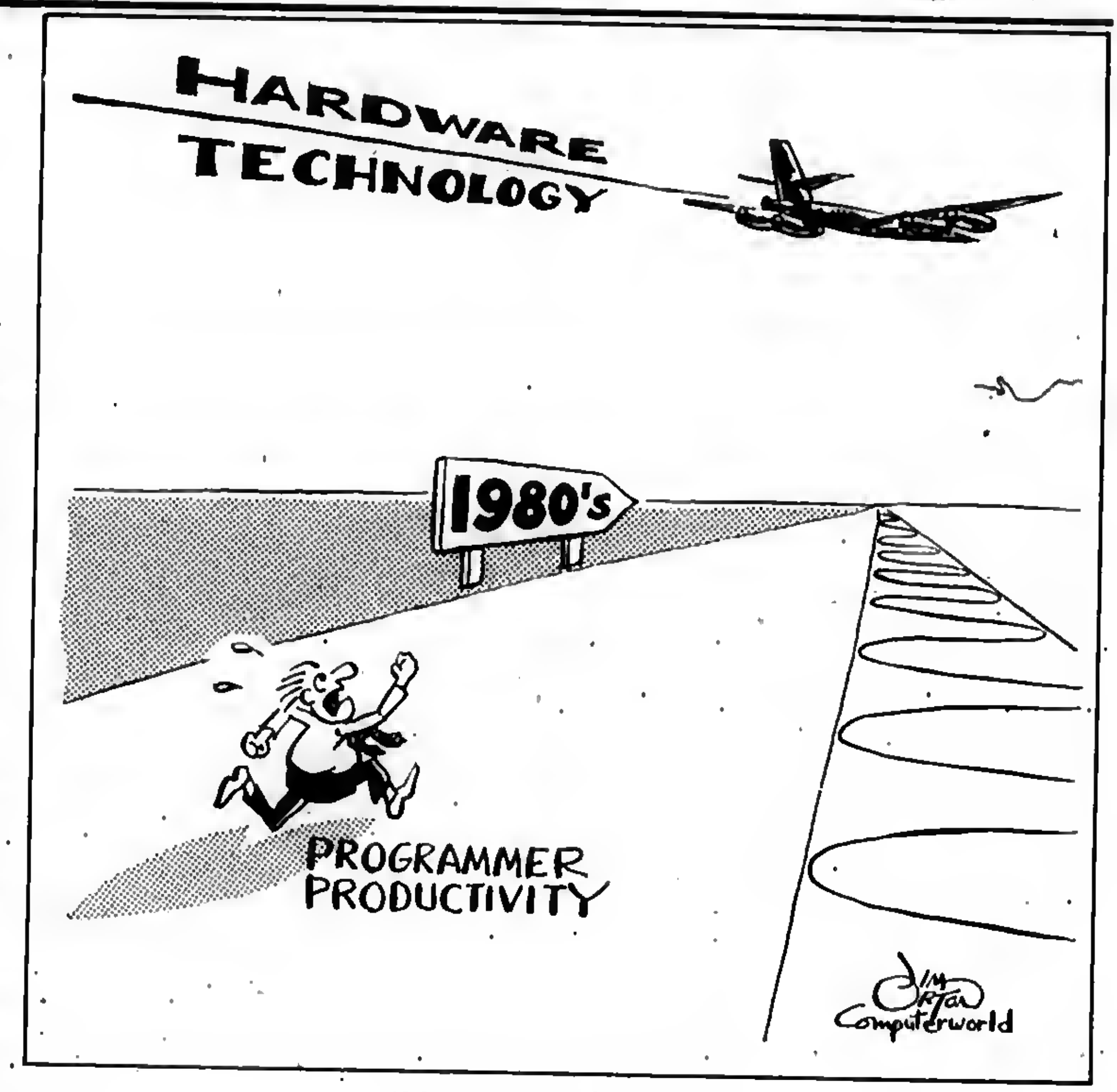
SAN FRANCISCO — Itel announced a 7305-2 fixed-head file that was plug-to-plug compatible with the IBM 2305-2; a 7305-3 file that offered slightly lower performance; and a 7835 control unit, compatible with the IBM 2835.

Eight Years Ago
Sept. 3, 1969

WHITE PLAINS, N.Y. — IBM introduced the 54-nsec system 360/195. The company described it as big, very fast and priced to offer users more for their money than large-scale systems made by other companies. Delivery was scheduled for 1971.

— — —

LOS ANGELES — Computer Sciences Corp. announced it would offer a broad range of facilities management services, including equipment installation, checkout/testing and maintenance. The services were being offered to users as an alternative to hiring IBM's field and systems engineers.



'Hey, Wait for Me!'

Letters to the Editor

Credit Should Go to RCA

How quickly we forget! The Aug. 8 editorial, "New Heyday Coming?", stated that Amdahl is "generally credited" with the "concept of the alternative system."

My associates and I vividly recall that RCA was the first to offer (and sell) CPUs that would run IBM operating systems. That was back in 1970, before many folks knew how to spell Amdahl.

Jerry B. Nesmith
Atlanta, Ga.

Unfair to Withington

The headline on page 3 of the Aug. 8 issue as well as the first paragraph are unfair to Frederick Withington. To suggest that his reluctance to testify against IBM stems from his contractual relations with that company is laughable to anyone who knows the gentlemen, but unfortunately may affect his reputation to those who don't.

The issue in the case was whether the govenment, in it efforts to show IBM monopolized the industry, had the right to force an expert to disclose in court the knowledge he gained from his employment without agreeing at the same time to pay an expert's fee.

The Court of Appeals in New York noted that Withington had agreed to testify but later declined at the direction of his employer, Arthur D. Little. The court also noted that questions of conflict of interests were considered before ADL appealed.

The issue, said the Court, was well stated by Withington when he said "the government is seeking the very core of my expertise which I do not wish to provide and which I consider to be a proprietary asset available solely to my employer or to those for whom I wish to work."

For CW now to imply that Withington's real reason for protesting the government action was that he owned IBM stock and had received payments from IBM as advances for a book to be published through Addison-Wesley, his longtime publisher, does dishonor to an honorable man.

Robert Bigelow
Boston, Mass.

Satisfied Micro User

As a dedicated computer hobbyist and professional programmer, I read with dismay E. Dijkstra's statement that micros produce unreliable output ["Micro Programmers Seen Facing Old Problems," CW, Aug. 15]. I speak from personal experience when I say that the output from micro-based systems is at least as reliable as that from a large system.

My own micro, built from a kit, has enjoyed a perfect record of performance in the eight months it has been operating.

I think the reliability problems we hear so much about are mainly caused by unfamiliarity with kit building or using the cheapest available parts instead of the best.

I. Barron's statement, quoted in the same article, that "What is really needed is a 4- or 5-bit word length" appears to be the result of rather fuzzy thinking. The 4-bit word is available in the 4004 processor from Intel, but I don't see very many people using it in computers.

If we went to 4-bit words, what would happen to the magnificent APL character set? Efforts in computer graphics and artificial intelligence would be crippled by Barron's suggestion.

William L. Colsher
Hoffman Estates, Ill.

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Detach here, fold, and place in post-paid envelope attached through binding.

Automated Physician Seen Design Fantasy

By Jack Stone
Special to CW

Surely all of us will speculate on the real utility of computing systems in medical practice if we have to enter a hospital for diagnostic or therapeutic procedures. One conventional style for reporting on the effectiveness of the technology in this area is to interview a well-known physician who has had great success in using it.

But circumstance provided me with an alternative — extended informal discussions with articulate members of the new generation of medical practitioners.

A few weeks ago, I traveled to the Rangeley Lake region of northwest Maine; I had been invited there to catch up on some writing commitments and enjoy the beauty and serenity of the area. It was a serendipitous event when I met two of the other houseguests.

One was Karen Hendrickson, a 24-year-old registered nurse from Washington, D.C.'s George Washington University Hospital, a facility associated with the George Washington Medical School. The second was her escort, Gordon Anderson, 28, a third-year medical student at George Washington.

We talked about many aspects of their careers, including subjects of professionalism, humanism and ethics in the practice of medicine. Karen and Gordon easily related to my questioning regarding the role and potential impact of computers in medicine. Here is a relevant distillate of our converstions:

Question: Where do you feel that computer technology has been particularly helpful to the medical profession?

Karen: Computer-based instrumentation in emergency situations has been of inestimable value. It has assisted physicians in saving many lives because it provides physiological information very quickly.

Question: Do questions of instrumentation accuracy or reliabililty give you cause for concern?

Gordon: Not really. We all recognize we're dealing with machines which, although they are expertly engineered, will break down from time to time. The equipment is always under the watchful eye of a trained person who has the experience to react to a machine malfunction.

Oh, I'm sure that human and machine errors have been made, but the net of it is that many, many more lives have been saved with the equipment than have been lost.

Question: How about outside of emergency situations?

Gordon: New computer-based systems are regularly arriving in hospitals today because of the falling costs of hardware. For example, computer-controlled X-ray scanning instruments are providing answers to medical questions which previously were available only from exploratory surgical procedures.

As another example, hospitals use computer-based patient monitoring equipment in the intensive care units. This gear allows continuous monitoring of a group of these patients by a relatively small number of medical personnel, thus releasing highly skilled people for other crucial assignments, a goal of great concern to most hospitals because of shortages of personnel in this category.

The Human Connection

Question: How about the uses of computers in the educational process?

Gordon: We have remote access to a comprehensive computer-assisted instruction [CAI] system from a terminal in our library. Our CAI provides literally hundreds of hours of tutorial drills in such subjects as anatomy, physiology and biochemistry. I only wish I had more time to spend at the terminal.

Question: What do you think is the area of greatest need for computer support?

Karen: That's easy — automatic storage and retrieval of patient medical records. These records are typically unsorted pieces of many different forms, haphazardly filed.

Frankly, the records are in such a mess that, in the interests of saving time, doctors and nurses are often forced to repeat medical history interviews and lab tests, which naturally result in more trauma for the patients and more cost to the hospital.

Question: There is speculation about the completely automated doctor — over a machine which interfaces directly with the patient, conducts the history interview, makes the diagnosis and dispenses the medicine. What are your comments on this possibility?

Gordon: If such a machine were built, I guess I would keep an open mind before I accepted it or rejected it for my practice. But I would surely want to carefully study the results from tests by research and clinical physicans, as well as patients' comments, before I ever used it with my patients.

You see, I believe in the treatment of the whole person, trying to understand and respond to not just the physical ailments, but to the patient's emotional and social problems. This philosophy is of growing importance today, since perhaps 70% of the people visiting the doctor's office have symptoms derived from other than purely physiological causes.

A successful treatment program of this kind is strongly dependent upon proper diagnosis, which in turn is dependent upon the willingness of the patient to communicate symptoms accurately.

Based on what I know now, I feel that it will be a long, long time before human affections are machine-programmable.

Kahn's Ideas Reduce Overbooking's Damage

Overbooking by the airlines is a computer optimization problem that is continuing to plague the public. Alfred Kahn, the new chairman of the Civil Aeronautics Board, understands the concepts of optimization as well as any DPer.

However, in his personal set of equations for the optimization function, Kahn includes certain variables not often included by systems designers.

The Taylor Report
By Alan Taylor CDP

He includes, most importantly, factors that measure the amount of damage to society — and then seeks to minimize that damage. This factor may well be the most important missing variable in innumerable computer applications.

It is therefore not surprising that the answers Kahn comes up with differ from the ones that others develop. A measure of this difference was evident in one of Kahn's first press conferences.

At that conference, he suggested a different approach to solving the overbooking problem, an approach that minimizes the damages while retaining the advantages of overhooking.

Kahn brings the passengers into the equations by suggesting they have a say in the matter. In his off-the-cuff comments, he suggested offering $100 to any passenger who volunteered to be bumped from a flight.

Dutch Auction

Another idea — that the pilot conduct a type of Dutch auction before take off to get enough passengers to deplane — is interesting enough to follow through beyond the simple monetary amount Kahn suggested. Many passengers are not going to stop flying at the end of one leg of their journeys, so they could be offered alternative routings to their final destination, as well as the compensatory cash.

Other passengers flying on some of those odd connections — the ones that can keep you in the air for eight hours at a stretch without more than repeated peanut snacks — might well fall for a deluxe dinner.

The number of positive inducements that can be offered to encourage deplaning would be limited only by the imagination of the auctioneers.

Negative inducements — items which would make deplaning very unwelcome — could also be figured into the equations. For instance, a passenger's worry about the people who will be waiting at the airport to meet him is a most powerful deterrent to deplaning. An airline that used its own resources to track down and inform those people would be way ahead — particularly if there was some form of hospitality offered to those meeting bumped passengers.

Yet another way to reduce the social damage from overbooking might be to exclude certain passengers even from being asked to volunteer to deplane or from having to take part in a lottery. Grandmothers traveling to grandchildren's weddings, anyone going to a funeral, children flying to their parents, for instance, could reasonably be given preference on a flight.

All of these methods — positive inducements, negative inducements and priority rankings — can by their mere exercise reduce the social damage of overbooking. Even if a person is bumped from a flight, the damage is reduced because he knows that he and the other passengers have made the decision jointly with the airline, rather than having been the subject of an arbitrary act by itself.

The Ultimate Situation

One of the problems with the Kahn technique would be in identifying the ultimate problem size. Currently the figures show thousands who are unable to reach their destinations within four hours — but the figures are silent regarding the number who are drastically disturbed by late arrival, be it two hours or 12.

Yet it is in the number of really serious events (such as the Ralph Nader bumping) that the problem really exists. If there is a serious situation, such as the last flight out on Christmas Eve where no one wants to be bumped, even for $200, then some decision has to be reached. Presumably a lottery would choose the unlucky one — but the need to hold such a lottery would, of course, be a reportable event.

Naturally, the question of whether overbooking of that specific flight (as opposed to other flights) was proper could be looked at, and hopefully if the same situation recurred the algorithms would take the cause into account. In fact, the very existence of "ultimate situation" reports would indicate a variable missing from or miscalculated in the current algorithms. And finding missing and incorrect variables is exactly what any proper optimization technique should do.

The Kahn approach, therefore, could operate to optimize situations in a way we currently do not. As well as looking at the social dangers, it also improves the technical situation. And that's an excellent result.

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'I'd Flunk CDP Miserably'

Letter to Lord From Rigo: 'Sorry, No Deal'

By Joe Rigo
Special to CW

Dear Ken Lord,

Thanks for the offer, but it's no deal.

I read your challenge to me in the July 25 issue of this paper to take and pass the exam for the Certificate in Data Processing (CDP). Now, the exam may or may not be any good, but on one point you are absolutely right: I would flunk it miserably.

I can say this with some authority. I've been flunking tests like this for years.

This is one reason why I am so opposed to the CDP and to its illegitimate stepchild, the Certificate in Computer Programming (CCP). If I ever have to pass one of these things to keep my job, it will be the end of a beautiful career.

My problem, alas, is that I have become an old man. It is not that I turned 44 a couple of months ago. The important figure is that I have been in data processing for 13 years now.

Tests like this are for kids just out of school. Kids are equally ignorant in all areas. Their heads are filled with useless facts. They can remember the difference between AND and OR without looking it up.

Reader Commentary

My brain is pockmarked with hills and valleys. Things like AND and OR are hidden away with my sixth grade lists of the major exports of South American countries.

A lot of us old people are like that. We remember what we need for today's job, and we learn what we will have to know for tomorrow's. The rest gets rusty.

Then there is the question of motivation.

Admittedly, I could improve my chances for the exam by hitting the books. But what's the point?

I have been around for a while. I have a track record. Good or bad, the products of my work are available for inspection. Even worse, there are living witnesses who will blab the truth to anyone who asks.

Acquiring a CDP would do nothing to improve my failures or reduce my successes. It certainly would not inspire any of the witnesses to change their minds.

Finally, let us consider whose leadership I would be following.

There can be no question that some very good people have acquired a CDP. I have purchased the Brooklyn Bridge myself a couple of times over the years. But let's not confuse the buyers with the sellers.

Consider for a moment the words of the Chief Professional Prof. G. Gary Casper, CDP.

Casper is one of your people, Ken. He is this year's president of the Institute for the Certification of Computer Professionals (ICCP). He is in charge of peddling certificates to an industry that seems to get along very well without them.

I quote from his article in the July issue of *Infosystems*:

"The trade and technical press, convention speeches and publications of the professional societies are full of examples of massive and pervasive incompetence on the part of computer practitioners . . .

"An even more appalling situation is that our computer systems are designed, implemented, operated and controlled by people who virtually lack any commitment, social responsibility or ethical control. The only responsibility many of these people accept is the periodic gathering of a paycheck."

Now be honest, Ken. Do you really expect me to do business with a guy who goes around saying that my friends and I are nothing but a sleazy bunch of bums?

As an alternative source of leadership, let me throw out the name of Carmine Vona.

I worked with Carmine a few years ago at one of the large banks in New York. I like to think of him as a chief programmer in the best sense of the term. He prefers to be classified as a systems analyst, but that topic is for another article.

Carmine was a professor of nuclear physics in Italy. He worked there for IBM for a while, spent a year teaching school in northern Brazil and eventually made it to the U.S.

When I knew him, he was dragging the bank, kicking and screaming, into modern systems design. He investigated the application, designed the system and supervised the analysts and programmers who implemented it.

When he says the next project phase will take X weeks and cost Y dollars, you can set your watch by it.

Carmine drives his people mercilessly, but everyone wants to work for him. Somehow he always finds time to drill some of the fine points of system design into the head of a young programmer.

I have never heard Carmine say a bad word about anyone. He makes everyone around him look good. His managers are constantly getting promoted. His systems work, and his users love him.

Carmine does not have a CDP. He is not active in any of the professional societies. He does not attend industry conventions or user group meetings. He works like a demon all day on the job, and he goes home to his family in Brooklyn at night.

Alas, I am no Carmine Vona. I am up to my eyeballs in professional associations. I look forward to meeting old friends at the conventions. And I am hopelessly addicted to writing these occasional articles for CW.

But I still have a few years to go.

Chief Professional Casper and his ilk can go on ranting about how rotten we all are. You can have him, Ken. You can also have the CDP, the CCP, the code of ethics and Professionalism.

I just want to be like Carmine Vona when I grow up.

Letter to the Editor

Chess Schedules at Ifip

I must correct an implication of the caption to the Aug. 15th front-page photos of the chess tournament at Ifip Congress 77.

The caption reads "Some played games as others crowded into technical sessions." In fact, the chess tournament was held entirely during hours when no technical sessions were being held. One could watch all the chess games and still attend a full schedule of technical sessions.

Daniel Glazer
Washington, D.C.

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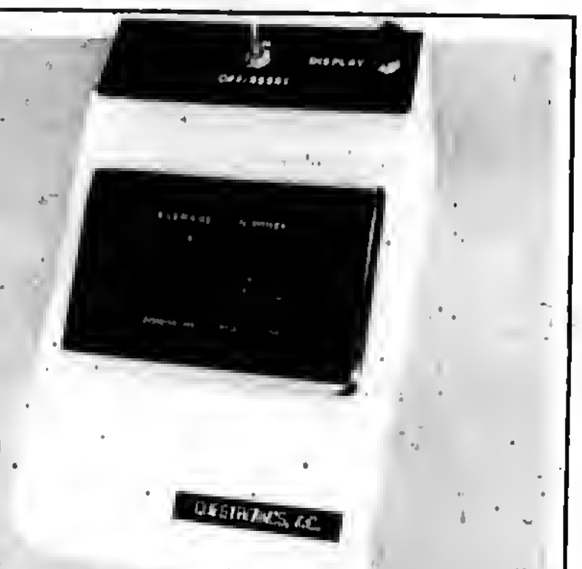

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Help Wanted

A special report on Data Base Management Systems (DBMS) will be part of the Oct. 31 issue. We welcome suggestions on topics to be covered and user-written articles describing experiences with the systems.

Write-ups should focus on problems and solutions affecting any part of the user's expectations, selection, implementation or use of the DBMS — or, if appropriate, why the project failed.

Contributions should not exceed 1,200 words (four or five double-spaced pages) and should reach Don Leavitt, Computerworld, 797 Washington St., Newton, Mass. 02160, by Sept. 24.

Names Asked For CPE Prize

WASHINGTON, D.C. — The annual A.A. Michelson award recognizes a significant contribution in the realm of computer performance evaluation (CPE). Nominations for this year's award are now open and suggestions from anyone "would be most welcome," according to selection committee chairman Phil Kiviat.

Presented by the Computer Measurement Group (CMG), the 1977 award will be made in late November when CMG holds its annual meeting. This year the meeting will be held jointly with the Association for Computing Machinery Special Interest Group on Measurement and Evaluation (Sigmetrics).

Started just three years ago, Michelson awards have gone to Kenneth Kolence, Thomas Bell and, in 1976, to Kiviat.

The names of award candidates and summaries of their accomplishments should be submitted by Sept. 15 to Phil Kiviat, Technical Director, Fedsim, Washington, D.C. 20330.

Annual Survey Finds

'Average' DOS Site Has 135

By Don Leavitt
CW Staff

MINNEAPOLIS — The "average" IBM DOS installation has a purchased 370/135 with 3340 disk drives. The most popular software products are Cobol, Power, CICS and Dbomp — all from IBM — and Panvalet from Pansophic Systems, Inc. These are among the conclusions of the latest annual survey of the Minnesota DOS Users Group, according to Tom Teresi, president of Advance Computer Systems Co. and former president of the group.

Adamantly independent of IBM, this group is one of the largest and most active organizations of its kind in the country. It has over 300 members, many of whom are from the upper Midwest. In addition to conducting the annual survey, the group holds monthly meetings to discuss common problems and, hopefully, solutions.

"This year's survey was our largest ever. We had 160 installations representing 175 IBM 360/370 CPUs," Teresi said. "All machines supporting DOS or DOS/VS were represented. They ranged from a 360/22 with 32K to a 370/158 with 3M bytes (real). We even had a response from a [Control Data Corp.] CDC 480 site.".

Detailed survey results were provided free to members of the group who completed a questionnaire on their installation.

Some Surprises

The results contained a number of surprises. Most notable, as far as Teresi was concerned, was the finding that only 67% of the installations have 370s installed; one-third still had only 360s.

Equally distressing to IBM must be the fact that only 21% of the on-order 370 CPUs are replacing installed 360s. "There is no joy in Armonk over these conclusions," Teresi mused.

"Evidently the 360 series continues to offer a good bang for the buck. The 360 users' resistance to upgrade has forced IBM to make improvements to the 370 line (e.g., VS, 138, 148). Similarly, improvements in the 370 line have brought about significant price reductions in the 360 series.

In the software category, only one product was able to command a larger following than the IBM alternative. Panvalet was the most popular source library system, even surpassing the free source statement library facility of DOS.

However, IBM's hardware and software products were the most popular in all other categories. Of the 87% who spooled, nearly three-fourths used IBM's Power. Fully 50% of the teleprocessing uses chose CICS. Surprisingly to Teresi, only 60% of the users reported having an on-line system.

A data base system was used by 43% of the users. In what turned out to be a close "race," IBM's DL/1 with 15 installations edged out Total from Cincom Systems with 12 users. However, neither package could match Dbomp with 29 installations.

As expected, Cobol is used as a primary language at 65% of the installations.

Further information about the group's meetings or the survey is available from Teresi at Advance Computer Systems Co., 3333 Regent Ave. N., Minneapolis, Minn. 55422.

APL-Based 'Quickplan' Helps Financial User

BETHESDA, Md. — The APL*Plus Quick Planning (Quickplan) system, now on the Scientific Time Sharing Corp. remote-computing network, is designed to help in corporate planning and reporting, according to a network spokesman.

The vendor sees Quickplan as particularly useful in generating a variety of financial reports including balance sheets, income statements, budgets, spread sheet analysis; forecasting, sales projections and lease/buy analyses.

Although the system is based on APL, little or no knowledge of that language is required to use Quickplan. Most of the user's responsibility lies in responding in English to the system's requests about what data is wanted and where it should be placed.

The system supports the naming and positioning of page headings and column titles in that way as well as the assembly of data from existing files. Simple mnemonic operators give the user basic tools to define what fields or lines are to be accumulated for subtotals and totals.

In some cases, the system calls on the user to indicate which of several possible choices he wants Quickplan to follow by keying in one of APL's special symbols, but its use in such a situation is unrelated to the symbol's conventional use within APL.

Practically the only time the user needs to be aware of how APL works is when the report program and, if desired, a calculation program to determine new values from givens, have to be brought into "workspaces," a concept unique to APL, before they can be used.

Scientific Time Sharing Corp. is headquartered at 7316 Wisconsin Ave., Bethesda, Md. 20014.

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Computer Science Group Seeks Curriculum Reaction

J. Daniel Couger On Education

The working report on curriculum for an undergraduate program in computer science has been released for comment by the Association for Computing Machinery (ACM) Curriculum Committee on Computer Science (C^{3}S).

Revision of "Curriculum '68," the widely accepted model for degree programs, has been a long time in the making. The revision cycle began in July 1974. More than 50 persons provided direct input to the basic C^{3}S committee composed of: Richard H. Austing (University of Maryland), Bruce H. Barnes (National Science Foundation), Della T. Bonnette (University of Southwestern Louisiana), Gerald L. Engel (Virginia Institute of Marine Science) and Gordon Stokes (Brigham Young University).

This column will discuss the curriculum model. The next one will review the committee's recommendations related to staff and facilities.

The computer science curricula fans out from Computer Programming I and II to Assembly Language Programming, Introduction to Computer Organization, Introduction to File Processing or Organization of Programming Languages. The Assembly Language and Computer Organization courses each lead to Operating Systems and Computer Architecture I, while the File Processing course leads to one on Data Structure and Algorithm Analysis.

The computer science major consists of these eight courses plus four others, selected from a range of elective advanced courses. The committee purposely omitted a course in "Computers and Society." The reason will be explained below.

These 12 courses represent 36 of the 48 semester hour minimum requirement for the computer science major. The remaining 12 hours would be taken in mathematics.

The student begins at a very practical level and progresses to more conceptual and theoretical material. At the junior level the student program is strongly conceptual, while the senior year the program may be fully theoretical or involve a significant amount of theory supplemented with laboratory activities.

Ambiguous Math Requirements

The report appears somewhat inconsistent in its math recommendations. Page 3 states, "It was recognized in the process of specifying this core material that no mathematical background beyond the ability to perform simple algebraic manipulation is specifically required as a prerequisite to an understanding of the topics."

Page 12 says, "The interaction of mathematics with the computer science curriculum is clearly indicated by the prerequisite chart given. It is specifically recommended that all computer science students take Introductory Calculus, Mathematical Analysis I, Linear Algebra and Discrete Structures. Depending on computer science electives chosen, Mathematical Analysis II and Probability and Statistics may be required."

Engel clarified this problem: "The eight core courses could be taken as a minor in another field, independent of the math courses. Students majoring in computer science are expected to take the math courses."

Only two courses were added to the curriculum model published in 1968, according to Engel: the file processing course and the computers and society course. Contents were updated for the remaining courses.

Societal Issues Left Out

The course on computers and society was omitted from the program so that prerequisites could be simplified to admit non-computer science majors. The report states that "a mixture of majors . . . would provide broadening interchange and would benefit both computer science students and the other majors."

When asked to indicate other major changes, Engel said "the integrated approach for teaching operating systems and computer architecture is new. Also, a new way of thinking is required to combine algorithms and data structures into one course."

Special Topics Courses

The report recommends that special topics courses be offered in addition to the 25 courses identified in the program, because "the available matrial is changing rapidly." Examples of the special topics recommended for consideration in such a course are: Microprocessor Laboratory, Performance Evaluation, Telecommunications/Network/Distributed Systems, Systems Simulation, Graphics, Artificial Intelligence, Structured Programming, Software Engineering — Large Systems Design, Topics in Automata Theory, Topics in Computability, Topics in Formal Language Theory and Simulation and Modeling.

Copies Available

The 16-page working report was published in the June 1977 issue of *SIGCSE Bulletin*. Copies may be obtained for $2 each from ACM, 1133 Avenue of the Americas, New York, N.Y. 10036.

C^{3}S is soliciting comments on the proposed curriculum. They must be submitted by Dec. 1 to Gerald Engel, Department of Computing and Statistics, Virginia Institute of Marine Science, Gloucester Point, Va. 23062.

Couger is professor of computer and management science at the University of Colorado.

T/S Net Adds Foreign Data

WALTHAM, Mass. — A financial data base covering balance sheet and profit-and-loss account items for each of 2,000 foreign companies, Exstat was developed in England and is now available through the international time-sharing network of Interactive Data Corp., a spokesman said from 486 Totten Pond Road, Waltham, Mass. 02154.

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DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals.

Litton's 'Blue-Collar' Job for Finance System

At a Litton plant in Van Nuys, California, Liliane Perini enters production data, encoded on a magnetic stripe, into a terminal of the IBM 3600 Finance Communication System.

Designed to meet the diverse needs of today's financial institutions, the IBM 3600 Finance Communication System is also proving highly useful in the manufacturing environment.

At the Data Systems Division of Litton Industries in Van Nuys, California, and Lubbock, Texas, a 3600 controls the flow of materials through plants that produce command and control systems for the United States Government. The key component is the 3604 Keyboard Display. Used as a teller terminal in many banks, it serves as a data entry and display terminal at Litton.

Whenever a shop order is created, the 3604 encodes product information on the magnetic stripe of a "traveler card"—much like a personalized bank card—which accompanies the material being processed as it passes through a series of work stations. After work is completed at each station, the worker inserts the card in a 3604 Keyboard Display, which reads the encoded data, times it and enters it into Litton's IBM System/370 Model 158.

Production workers enter information at the 3604 through easy-to-use function keys, with step-by-step guidance provided by the system. Data captured at the 21 shop-floor terminals updates master files of open orders stored in IBM 3601 controllers, which act as local processors.

"The exact status of any order is available to production supervisors at any time through the terminals," says Bertram Voddon, vice president of operations. "Each night, accumulated data is forwarded to the computer in Van Nuys, where it is processed and made available the next morning in the form of production reports and analyses."

As John Lawrence, vice president of finance for the division, points out, the online 3600 system does for shop orders at Litton what it does for bank accounts at financial institutions—it makes full, up-to-date information available to authorized personnel.

"And with 9,000 shop orders active here at any one time, that's no small accomplishment," he adds. "The 3600 is keeping us on top of operations in a way that was never possible before."

J.I. Case: Super Service on Spare Parts

"We've been able to cut inventory by more than 12 percent," says Jack A. Chobanian, director of service parts supply systems at J. I. Case, one of the largest and oldest manufacturers of farm tractors and construction vehicles in the United States.

Four years ago, Case converted the management of its service parts inventory to an online computer system which it calls AIDS (Automated Inventory Distribution System).

"Even while reducing inventory, we eliminated 75% of our backorder count. Conversely, our 'fill rate'—the proportion of items delivered without backorder—improved by 8% in the same period."

Case, a Tenneco company, fills 2,000 orders a day, shipping a total of 20,000 line items from its main warehouse in Racine, Wisconsin, to ten regional warehouses and a network of distributors and dealers.

To support its broad line of current equipment models, in addition to earlier models spanning the past 35 years, the Case Service Parts Division maintains an inventory of 155,000 separate part numbers.

"We were able to cut $8 million out of inventory while increasing the fill rate because the online system gave us much better forecasting data," Chobanian notes.

"Previously," he continues, "we based our inventory projections on replenishment orders from the warehouse. Now, with order entry as an online system, we can look at accurate figures for real dealer demand."

AIDS runs on a System/370 Model 168 in Case's corporate computer center in Racine, under Multiple Virtual Storage (MVS) and Information Management System/Virtual Storage (IMS/VS). The system is accessed through 85 IBM 3277 Display Stations in warehouse and office locations.

Major online subsystems include order entry, depot replenishment, order inquiry, purchasing, receiving, forecasting and warehouse control. Under AIDS, orders received before 1:00 PM are shipped on the same day; those received later go out the next day.

"Before we installed AIDS, the division's warehouses were full to capacity just with agricultural parts," Chobanian notes. "When spares for the construction equipment line were added to its responsibilities, the division wanted to add new warehouse space. Now, with AIDS, we are handling both product lines from the same space.

"At least as important as the purely financial gains from slimmer inventories and fewer backorders," Chobanian asserts, "is the way AIDS has improved customer service. The lack of a small part, worth a few cents, for a work vehicle can stall an entire construction project at a cost of thousands of dollars a day. Similarly, a farmer's losses can be devastating if a tractor goes out of service during a harvest.

"With the online AIDS system, we're getting repair parts out where they're needed, faster than ever before. And our customers really appreciate it. We can't measure the business gain directly, but we know it's important."

AGRI KING
case

J.I. Case uses an online IBM computer to help insure that service parts are always available for farm tractors (above) and construction equipment.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

Project Control Still Seen as Vital Application

• Net Adds 'Prosys/80'

WOODBURY, N.Y. – The Prosys/80 service is a project control system that integrates project scheduling, cost control, accounting, resource leveling, forecasting, performance measurement and data base management, according to a spokesman for Calldata Systems, Inc., which offers the service.

Among the graphic and tabular outputs of the service are schedules, comparison schedules, network logic diagrams, cash-flow reports and manpower leveling charts.

Users may specify their unique input, output and computational requirements while still using the system's standard algorithms, the spokesman claimed: Major items that Prosys/80 will control include time, manpower, costs, quantities and equipment needed for a project.

The system should be especially useful for projects in construction, engineering, plant maintenance and shutdown, education and manufacturing, as well as research and development and government programs, the spokesman suggested.

The facilities of Prosys/80 are available on the Calldata remote-computing network or in a software package that can be installed on an IBM 370 or many other CPUs that support standard Fortran.

On the network, the user is charged for time and resources used. The packaged version of Prosys/80 requires some 300K of main memory and a mass storage system and costs approximately $50,000 depending on modules selected, Calldata said from 20 Crossways Park N., Woodbury, N.Y. 11797.

• Cobol Base Of 'N5500'

CENTURY CITY, Calif. – The N5500 package from Nichols & Co., Inc. is described by the vendor as an efficient project management system designed to effect cost and time savings for its users. Written in ANS Cobol, it can be used with almost any modern CPU, the spokesman added.

An extension of the company's previous Procon 3 package, N5500 provides a range of capabilities including project analysis, simulation, forecasting, project costing and billing and manpower loading, he said.

Dictionary Used

The planning process supported by the package is based on a transaction-loaded dictionary, which may be easily updated, according to Nichols. Improved planning efficiency is also maintained through dynamic load leveling which feeds tasks within projects by set priorities, the spokesman noted.

Automatic resource assignments will select the individual or group that can best accomplish the specific task, and there are nine priority levels available for resource allocations, he said.

Self Starter

Also supporting and enhancing the planning efficiency provided by N5500 is an automatic project-generation facility. This allows for the creation of new projects from existing ones, bypassing all the effort usually required to establish a project under control of N5500, he continued.

The current package produces 20 reports and two output files, the latter interfacing with a graphic plotter and "any in-house system," according to Nichols.

VS Operation Best

It has been implemented in 140K in an IBM 370 environment and functions better under VS than OS, the spokesman noted. Honeywell, Univac and Burroughs sites can also install the package, he continued.

The ANS Cobol source code is available under a 35-year lease plan for $18,500, Nichols said from 1900 Ave. of the Stars, Century City, Calif. 90067.

Motorola 6800s Get FP Support

DENVER – A floating-point (FP) package and a cross-assembler with FP pseudo-operations are available from Scipro, Inc. for use with Motorola 6800 microprocessors. The basic floating-point package, FPP/6800, performs the arithmetic operations and Ascii I/O conversions, Scipro said.

An extended package also performs square root, exponential, logarithm, arctangent and trigonometric functions as well as floating-point comparisons. Three versions with 4.5, 7 and 10 digits can be selected to suit the user's applications, the vendor said.

The FPP/6800 packages are available on NS5204 and 2708 extended read-only memory chips. Custom formats and licensing for source code are available. The normal packages range from $120 to $360, according to Scipro.

The cross-assembler is written in Fortran IV and may be adapted to any computer with a minimum word length of 16 bits. The assembler accepts Motorola 6800 assembly code with additional features for forming FP constants.

The cross-assembler costs $450, Scipro said from 2600 W. Second Ave., Denver, Colo. 80219.

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Panelists Agree

Networks Need User/Carrier Confidence

By Ronald A. Frank
CW Staff

TORONTO — Users must build up a "confidence factor" with their carriers when planning international data networks, according to Charles Gobeil, a former data communications manager with Chrysler Corp.

Speaking at a panel session dealing with telecommunications management at the recent Ifip '77 here, Gobeil said he wanted to dispel the idea that "the user needs a little pot of gold in his back pocket" to get needed facilities from international carriers. "This world doesn't exist anymore," he said.

Robert McEwen-King, telecommunications director for Massey-Ferguson in Great Britain, said the user has to understand the operating rules in the country in which he intends to operate. Then he should contact the telecommunications administration accordingly with requirements that are reasonable.

It is important for a company to establish local telecommunications managers who know how to deal with local problems, he added.

Provide for Standards

Users would welcome more up-to-date standards, but usually they do not keep up with technological change because of the lead time required for standards formulation and agreement, he said. In allowing for changes, users should configure networks with built-in provisions for standards and technology upgrades, McEwen-King said.

Michael Ford, head of international service policy for the British Post Office, called for faster development of standards so that users of international data nets will not have to deal with different telecommunications administrations in each country.

"The user can't continue to negotiate with 15 different bodies," Ford warned his fellow panelists. The pressure of events will force much more rapid development of standards, he predicted.

As a case in point, Ford mentioned the evolving X.7X standard for the international interconnection of public data nets, which he said should be forthcoming "hopefully within a year.

"Many monopolist telecommunications carriers are criticized for their inertia and apparent disinterest in meeting the needs of individual users," Ford told the attendees.

"It is my experience that the truth is far from this. There are groups of specialists . . . who obtain great satisfaction from providing tailor-made facilities for user organizations," he said.

Because of the need to interface with many telecommunications administrations, the necessary staff and technical resources to get into international data nets are only available to the largest users, the panelists agreed.

"I really don't enjoy operating a large network and having to deal with 15 different agencies," McEwen-King said, "but I don't think it will change very soon."

Ford said the user should not expect too much from the carriers he is dealing with. The user is in the best position to deal with the vendors involved in supplying equipment for the network. "It is normal for the user to assume overall coordinating responsibility," he added.

Arnold Scully of Teleglobe Canada agreed with this concept. "The carrier is not in a good position to coordinate data communications nets," he said. Because of the various suppliers involved, the user is in the best position to exert pressure when it is necessary, he said.

Ford cautioned that in many European countries the biggest problem often is transmitting data from the user's office to the local exchange. "Sometimes even moving to the other side of the street can make all the difference," he advised.

Because of these types of operating problems, Ford urged users to select project managers who are familiar with the environments in which service is required.

Comten Front-End Processors Replace 270X and 370X Units

ST. PAUL, Minn. — Comten, Inc. has extended its line of communications processors with a programmable front-end replacement for IBM 270X and 370X processors.

In addition, it introduced what it called an advanced software processing and control system for distributed networking applications and announced peripheral equipment for Comten processors using the software system.

Comten's 3690 communications processor is a modular, programmable unit designed to operate in medium to large networks with IBM 360 and 370 CPUs or as a stand-alone data switching system.

Up to 512 full-duplex communications channels can be attached to the 3690 through 32 modem interface modules, providing the user with an aggregate channel throughput of 15.4M byte/sec for both storage banks within the processor, according to the firm.

The 3690 supports up to eight IBM host CPUs, provides support for IBM and non-IBM terminals and is qualified for satellite communications and advanced data switching networks, Comten said.

As a front-end system, it can relieve the host CPU of many processing functions including line control, polling, addressing, code translation and error recovery, the company added.

It can also operate as an advanced network control processor, performing networking functions, message switching and global control functions under the Comten Data Switching System (DSS), according to a Comten spokesman.

The 3690 is available in five configurations, varying in the amount of storage and other options.

Switching System

Comten DSS is a network processing and control software system that enables the Comten 3650 II, 3670 II and 3690 communications processors to act as front ends, remote terminal concentrators and data switchers, the company stated.

DSS is a group of licensed program products which are compatible with and are said to extend IBM's System Network Architecture (SNA). DSS also supports user applications, allowing them to communicate with host 360 or 370 systems in a distributed processing network.

The first two releases of DSS (Releases 1 and 2) can perform applications processing at the network level and can provide multiple host access for terminals, including IBM 3270 CRTs operating under BSC control, Comten said.

(Continued on Page 24)

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Hundreds of Terminals Operating On Datapac

By Ronald A. Frank
CW Staff

TORONTO — Datapac, Canada's packet switched network operated by the Computer Communications Group of Bell Canada, is serving more than "several hundred terminals," according to Andrew McMahon, vice-president.

Datapac was given final authority to begin operations in mid-1977 and at that time there were about 10 host CPUs on the network. For competitive reasons, McMahon said he could not give the total CPUs now on the network, but they include mainframes from Honeywell, Digital Equipment, Amdahl, IBM and Univac.

The objective of Datapac is to relieve the user of the many complex networking functions which must be done in-house to operate private-line nets. As a by-product of this goal, McMahon said Datapac will strive to have total compatibility and interchangeability with major terminals and mainfames.

Host of Applications

Among the applications now on the packet net, McMahon listed banking, trust administration, time-sharing and interactive teletypewriter traffic. In the finance area, it may soon be possible to access any credit data base with any credit card, if current Canadian plans materialize, he said. In this regard, a payments system is projected for Datapac that would link not only banks but also small stores that could do their accounting and credit processing using compatible terminals.

NCR is providing a service bureau operation designed to serve small retailers that have only a few locations. Part of this service includes the NCR 721 communications processor, he said [CW, Aug. 22].

Datapac is now operational in 57 Canadian cities and in addition, Bell Canada has agreements with CNCP to serve users in areas not covered by Bell.

Discussions have been held with regard to establishing Datapac connections with similar packet nets in Europe, but right now there does not appear to be a great user demand for that type of service, McMahon said.

An interconnection between Datapac and U.S. nets such as Telenet has higher demand from users and will probably be the next goal in widespread interconnections of packet networks. The best standard for packet operation and the one which appears to have the most support from standards groups is the X.25 protocol approved last year by the CCITT, McMahon said.

Comten Unveils 370X Front Ends

(Continued from Page 23)

Both releases of the software can also perform message handling, message switching, network security, statistics accumulation and maintenance aids for isolating and correcting system problems.

In addition, DSS Release 2 can support the new peripheral equipment, including Comten disk systems, magnetic tape systems, card readers and a line printer.

Peripheral Equipment

Comten disk drives feature a storage control unit with either fixed or removable media drives.

The fixed-media drives provide storage capacities of 24M- or 48M bytes. The removable-media disk drives provide storage capacities of 150M- and 300M bytes.

The company's magnetic tape drive consists of a magnetic tape unit and controller in one cabinet, the company stated.

The Comten card readers can read 80-column cards at speeds up to 600 card/min (Model 7305); the Model 7306 can read up to 1,000 card/min.

Comten also introduced the Model 7406 line printer, which can print at speeds up to 600 line/min at a density of 136 char./line.

Prices, Availability

The 3690 and DSS Release 1 processor will be available in the first quarter of 1978. DSS Release 2 and the peripherals are scheduled to be available in the fall of 1978.

A basic 3690 will cost $92,900 or $2,991/mo.

DSS licensed programs will have monthly license fees ranging from $250 to $450, Comten said from 1950 W. County Road B-2, St. Paul, Minn. 55113.

Micom Line Drivers Eliminate Data Sets

CHATSWORTH, Calif. — The Micom 410 asynchronous line drivers are designed for short-haul, in-house data transmission at distances from one to 12 miles over twisted pair cable.

Two versions are available: the Dumb Driver and the Smart Driver. Both are designed to operate in full-duplex mode at speeds to 9,600 bit/sec.

In addition, the Smart Driver version provides Bell 113A/113B-type simulation of all dial-up handshaking sequences, the company claimed.

The Micom 410 costs $150 for the dumb version and $185 for its smart counterpart, the company said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

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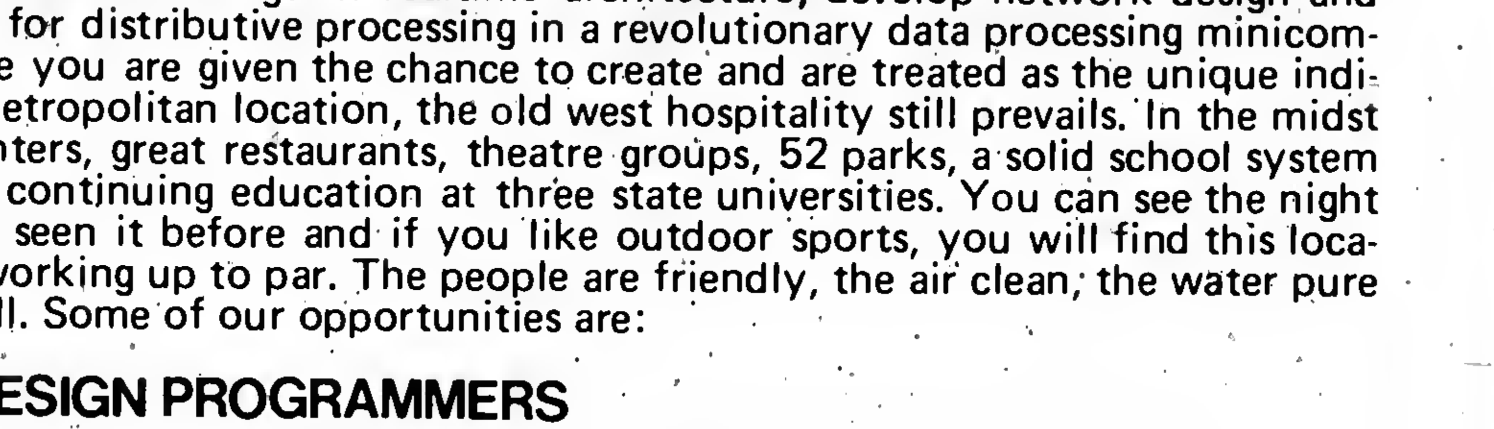

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Monitor Works With IBM 3277-2

SEATTLE – The Model 277 hardware monitor from Temco Products here is designed to capture and display the number of transactions passing through an IBM 3277 Model 2 terminal and also display each transaction's response time.

Power for the monitor is supplied by the terminal. The transaction and response time information, however, is displayed with zero system overhead, Temco claimed.

There is no increase in the attached terminal's response time because of the monitoring activity, the company added.

The 3-in. by 5-in. by 1-1/4-in. monitor has two constant LED readouts and a display reset and is attached to the terminal by internal connections.

The 277 monitor will not alter users' maintenance agreements with IBM for the 3277-2s, because none of the terminal's internal circuitry is altered, a spokesman explained.

Temco's response time and transaction monitor can also be used to monitor operator performance and costs $350, from 2150 N. 107th, Suite 110, Seattle, Wash. 98133.

Penril Has LSI Modem To Replace Bell 201s

ROCKVILLE, Md. – The Data Communications Division of Penril Corp. has introduced a 2,400/1,200 bit/sec synchronous LSI modem.

The 2400 LSI is designed for 1,200- or 2,400 bit/sec operation over two- or four-wire dedicated or dial networks.

The modem employs a four-phase modulation technique conforming to CCITT Type A or B and is on-line compatible with the Bell System 201B or C data sets and most other PSK modems, as well as the Bell 801 automatic calling unit.

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No external test equipment is required to install or troubleshoot the 2400 LSI, which costs $795 for dedicated lines, according to Penril at 5520 Randolph Road, Rockville, Md. 20852.

Datapro Seminars Slated for Users

DELRAN, N.J – Datapro Research Corp. will offer two-day introductory and three-day advanced data communications seminars this fall!

Each course costs $425 for current Datapro subscribers and $475 for nonsubscribers and will be held in Philadelphia; Washington, D.C.; San Francisco; and New York, Datapro said

The research firm can be reached at 1805 Underwood Blvd., Delran, N.J 08075

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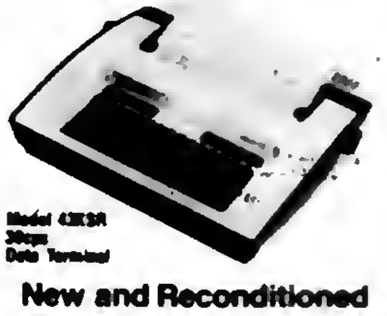

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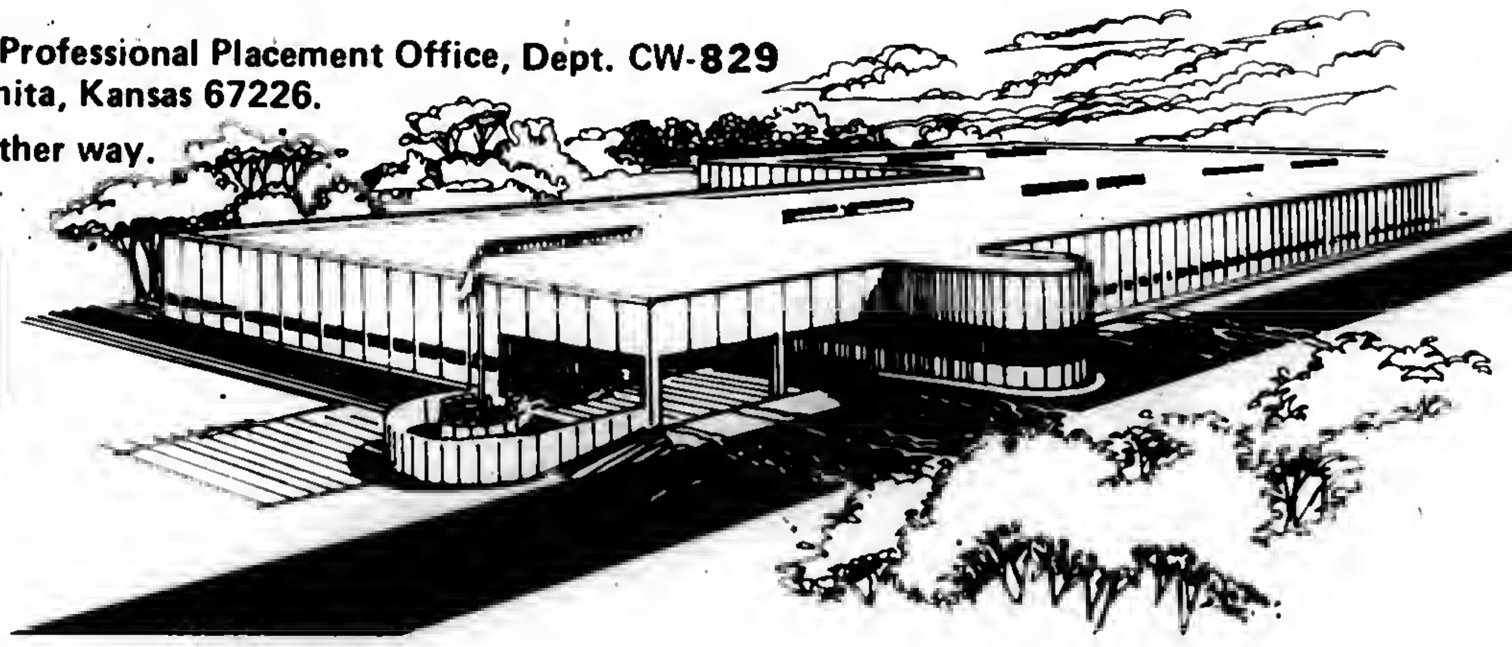

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Monitor Works With IBM 3277-2

SEATTLE — The Model 277 hardware monitor from Temco Products here is designed to capture and display the number of transactions passing through an IBM 3277 Model 2 terminal and also display each transaction's response time.

Power for the monitor is supplied by the terminal. The transaction and response time information, however, is displayed with zero system overhead, Temco claimed.

There is no increase in the attached terminal's response time because of the monitoring activity, the company added.

The 3-in. by 5-in. by 1-1/4-in. monitor has two constant LED readouts and a display reset and is attached to the terminal by internal connections.

The 277 monitor will not alter users' maintenance agreements with IBM for the 3277-2s, because none of the terminal's internal circuitry is altered, a spokesman explained.

Temco's response time and transaction monitor can also be used to monitor operator performance and costs $350, trom 2150 N. 107th, Suite 110, Seattle, Wash. 98133.

Penril Has LSI Modem To Replace Bell 201s

ROCKVILLE, Md. — The Data Communications Division of Penril Corp. has introduced a 2,400/1,200 bit/sec synchronous LSI modem.

The 2400 LSI is designed for 1,200- or 2,400 bit/sec operation over two- or four-wire dedicated or dial networks.

The modem employs a four-phase modulation technique conforming to CCITT Type A or B and is on-line compatible with the Bell System 201B or C data sets and most other PSK modems, as well as the Bell 801 automatic calling unit.

It features fast synchronization for use in multistation polled networks and point-to-point applications, Penril stated.

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Built-in local digital and analog loopback diagnostic capabilities reduce the time required to localize system malfunction, Penril added. A built-in test pattern generator and receiver pattern detector simplify on- and off-line testing and troubleshooting.

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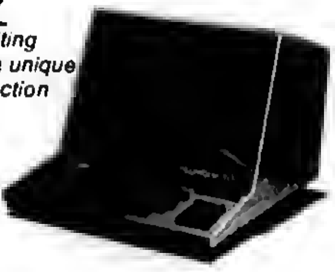

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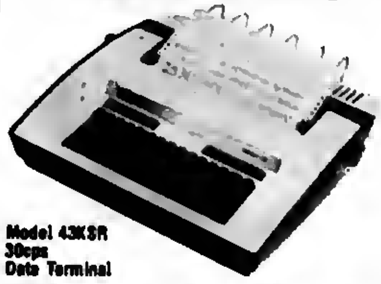

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Datapro Reports On OCR

By Frank Vaughan
CW Staff

DELRAN, N.J. — Datapro Research Corp. here recently published a report, "All About Optical Readers," in which 85 optical mark reader (OMR) and optical character recognition (OCR) users evaluate their equipment. In addition, the report includes comparison charts listing the features and prices of 71 optical readers from 34 manufacturers.

The report examines the current technology and concludes "OCR is as mature, or more mature, than any technology in DP, and the machines have always been very reliable." The stigma or unreliability must mainly be attributed to the actions of "over-zealous salesmen" or to the "naive DP manager," it said.

Looking at the current role of OCR, Datapro observed that OCR has a definite niche within data entry operations, and the report encourages knowledge and understanding of OCR as "an alternative means of data entry."

The report also examines the reasons behind — and difficulties caused by — the lack of a "standard" OCR equipment design. It also explains why there is no such thing as the standard OCR document, what companies usually want when they look toward OCR.

For the user's ratings portion of the report, Datapro summarized and averaged responses to a survey taken in February. Equipment was judged in the areas of overall performance, ease of operation, reading reliability, document handling reliability, document design flexibility, ease of job changeover and maintenance service.

The report costs $12 from the firm at 1805 Underwood Blvd., Delran, N.J. 08075.

80% Savings Claimed

One-Step System Processes Remittances

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Computer-Link Corp. introduced a one-step remittance processor at the recent OCR Users Association meeting here and promised that the stand-alone unit will reduce the payment processing costs faced by businesses by between 80% and 90%.

Called the SORC/800, the remittance processor contains Digital Equipment Corp.'s LSI-11 microcomputer with a 32K-word memory and contained communications capability.

The device is further self-contained in that it includes dual diskette drives, an interactive CRT display with 240 characters and alphanumeric operator instructions, a keyboard, an optical character recognition (OCR) scanner, a punch-card reader, an audit trail printer with 200 alphanumeric characters and a programmable check endorser, the firm said.

In one operation, the SORC/800 can process over 1,000 payments per hour at a cost of under 2 cents per payment — approximately 6 cents less per transaction than the batch remittance-processing method, the company added.

The unit can handle almost any style of multiple documents that must be simultaneously processed with fixed or variable information from a single document, including insurance premiums, loan payments, credit card payments, bank-by-mail, subscriptions, deposits, tax payments, monthly installments and mortgage payments, Computer-Link stated.

SORC/800 automatically inspects and compares the amounts of bill payment stubs with checks, reconciles the amounts and inscribes an audit trail. It endorses and separately batches both bills and checks, then produces payment records and deposit slips for transfer to the bank, a spokesman for the firm said.

The device will accept documents from 2.7 in. to 5 in. high and 4 in. to 9 in. long, as well as American Bankers Association (ABA) standard checks, and 16-pound to 32-pound paper and card stock, Computer-Link said.

Micr Inscriber

An ABA Magnetic Ink Character Recognition (Micr) inscriber required for automatic processing of endorsed checks is another SORC/800 feature.

The OCR scanner included in the device reads OCR-A alphanumeric, OCR-B, 407, 1403 Standard .095, 1428, E-7B, E-13B, E-12F, punched cards and hand print fonts, the firm stated.

Selling for between $32,000 and $37,000 depending on the kind and type of scanning required, the SORC/800 is available from Computer-Link at 14 Cambridge St., Burlington, Mass. 01803.

In-House Systems Best Choice For Fast-Growing Credit Unions

By John P. Morgridge
Special to CW

The in-house, general-purpose computer system offers a number of advantages to a large, expanding financial institution such as a credit union. Use of outside commercial service bureaus or of software houses/system builders on the other hand, has serious disadvantages for growing credit unions.

An increasing number of the nation's approximately 22,600 credit unions are studying their current and future DP needs. The business has seen an annual growth of nearly 15% per year since 1970, making it the fastest-growing segment of the U.S. banking and credit community.

As this business grows, the demand for additional member services grows even faster. Share drafts, loan drafts, preauthorized lines of credit, variable-interest-rate savings plans, 12-year unsecured loans, 30-year home mortgages, traveler's checks and money orders are now authorized, and legislation allowing unions to issue credit cards has recently been signed into law by the President.

Credit unions have three options for satisfying their DP needs: to purchase DP services from a commercial service bureau; to purchase a special-purpose system from a third party such as a system builder or software house; or to lease or purchase a general-purpose computer system for in-house use.

While service bureaus offer ease of entry to DP for smaller credit unions with no DP experience, and while third-party special-purpose systems can provide satisfactory solutions in certain situations, the in-house, general-purpose computer system offers significant demonstrable advantages for the larger credit unions.

Ease of Growth

Most service bureaus can accommodate their client's growth, but each workload increase results in a parallel cost increase. Since service bureaus itemize charges by account, transaction, report and so forth, each time the workload doubles, the service bureau billings also normally double.

Most computers obtained from software

(Continued on Page 28)

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In-House Route Best for Large Credit Unions

(Continued from Page 27)

houses or system builders are tailored to an assumed workload. Although some expansion ability is normally built in, when the expansion limit is reached, the credit union would need to purchase a second system (doubling its investment) or purchase a larger system and attempt to dispose of its outgrown equipment.

I recommend general-purpose computers purchased or leased directly from the manufacturer because they are highly modular. First, a user can add functions, increase capacity and even accelerate internal operations without replacing the CPU.

Second, field-installed upgrades are fast and economical. They can usually be installed between shifts.

Third, the workload can double and redouble with only moderate cost increases and without making the computer obsolete.

And fourth, even if the rapidly-growing credit union outgrows its general-purpose system, upward compatibility protects its investment in programming, applications and training when moving up to a larger system.

Software is the key to harnessing the power of the computer for constructive tasks.

The disadvantage of service bureaus is that they offer a fixed software capability. The same functions are performed the same way for all credit unions and it is difficult and expensive to modify software needs of individual users. In addition, service bureaus are unable to generate special one-time reports on demand, and new applications are limited to the service bureau's offerings.

While somewhat more flexible, specialized third-party offerings from systems houses come with limited software custom-tailored to existing applications. The hardware/software offerings are the same for all users in a given industry. Adding new applications, if possible, involves a major additional investment with the system supplier.

The User's Choice

Conversely, major computer manufacturers offer a wide selection of systems and applications software. The user has a choice of easy programming languages for inexperienced programmers or powerful languages for increasing sophistication.

The general-purpose system has extensive facilities for data management, communications with branch offices and utility functions. And new applications can be programmed in-house (with vendor assistance if you desire), obtained from a vendor or exchanged through users' trade associations. As credit unions expand, they need this easy, inexpensive access to new services applications.

The in-house system allows the user to control work schedules and priorities, avoiding service bureau drawbacks such as dependence on the service bureau's schedule and competing customers, reliance on complex communications links to large, distant service bureaus, or transportation of data to and from small local service bureaus. It also allows the user to retain its confidential files in-house where security is easier to control.

And finally, it should be remembered that large, established manufacturers have long-standing commitments to the DP industry. They offer strong financial resources and large research and development budgets for solving customer problems.

Morgridge is vice-president for General Systems Operations at Honeywell Information Systems, Inc.

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370/158 Add-On Debuts

BEDFORD, Mass. — Cambridge Memories, Inc. (CMI) has introduced an add-on memory system for IBM 370/158 CPUs that reportedly increases the main storage capacity to 16M bytes.

The Stor/158-4 permits the attachment of 16M bytes of storage to uniprocessor, multiprocessor or attached processor versions of the 158 Model 1 or 3, he said.

IBM has memory limits of 4M bytes and 6M bytes respectively for the uniprocessor versions of these models and limits of 8M bytes and 12M bytes for the multiprocessor versions.

No software changes in the 370/158 are needed to accommodate the add-on memory, CMI claimed. The memory sells for approximately $110,000 per megabyte. CMI is at 12 Crosby Drive, Bedford, Mass. 01730.

3M Introduces Four Disk Packs

ST. PAUL, Minn. — The 3M Co. here has introduced four disk packs for specific disk drives.

The 934 disk pack is designed for the Burroughs Corp. B9484-4, B9485-4, B9486-4, B9489-8 and B9383-6 disk drives. With a track density of 200 track/in. and a bit density of 4,400 bit/-in., the 934 offers 8,120 track/pack and has a maximum capacity of 121M byte/pack, according to a spokesman. The 934 sells for $375 each.

The 935-0 was designed for the Calcomp 225 disk drive and the 935-32 was engineered for the Univac 8440 disk drive. Both packs offer 220 track/in. and 4,400 bit/in. providing 8,120 track/pack and a maximum capacity of 116M byte/pack. The packs sell for $450 each.

The 949/40, designed for the Control Data Corp. 9760 and Ampex Corp. DM940 disk drives, is a soft-sectored pack with 192 track/in. and 6,038 bit/in. There are 404 data track/pack and a nominal capacity of 40M byte/pack. It sells for $325 per unit, the spokesman said.

All 3M disk packs offer Crashguard disk coating which protects against damage and headcrash, the spokesman added. 3M can be reached through P.O. Box 33600, St. Paul, Minn. 55133.

Sycor 440s Get Printer Option

ANN ARBOR, Mich. — Sycor, Inc. has enhanced the peripheral flexibility of Its 440 series of distributed data entry and processing systems by enabling cable-connected serial printers to be located up to 2,000 feet from the CPU.

The "distant printer" feature allows one or two Sycor Sprinter bidirectional serial printers to be remotely cable-attached to a 440 system, according to a spokesman.

The distant printers can be field-installed by adding a special I/O feature to the 440 control unit, he added.

The distant printer option costs $500 plus the cost of the cable from the firm at 100 Phoenix Dr., Ann Arbor, Mich. 48104.

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For Better Patient Care

Minis Facilitate Prescription Control

MONTREAL — Three minicomputers linked to several micros at remote locations are helping RX Information Center Ltd. here provide better patient care, according to the user.

The DP center was formed to acommodate the needs of Jean Coutu Pharmacies, a retail chain; Farmic, a pharmaceuticals distributor; and Casgrain and Charbonneau, manufacturer of pharmaceuticals and medical supplies, The minis are located at Casgrain and Charbonneau's head office here.

The system provides on-line prescription retrieval and creation at each pharmacy as well as on-line receipt/labels with directives for each prescription entered. Drug allergy warnings, doctor look-up and verification and comprehensive renewal controls are also provided.

The system also keeps a patient history of prescriptions, allergies and drug interactions as well as personal patient data. Automatic pricing and production of welfare and other government reports is also provided. Along with this, the system provides a comprehensive business program for the pharmacies' accounting and statistical applications.

"To expect any supplier to accommodate these requirements, I had to provide a comprehensive request for proposal," Robert Dionne, General manager, said.

After months of analysis and then subsequent evaluation of all proposals, Dionne made his choice. "I was looking for the best price/performance in hardware, but not having my own programming staff, I also needed either a software subcontractor or a supplier who would be totally responsible," he said.

Cygnet Minicomputers Ltd., a Montreal-based minicomputer vendor, was selected for the complete hardware and software implementation. Knowing full well that this was a specialized system and it would be difficult to project terminal response times, Dionne insisted on hardware and software performance guarantees before the work began. A maximum four-second response time was specified.

Paperwork Cutbacks

Now that the system is running, RX expects to cut costs and time in the paperwork side of prescription processing and to improve customer service. Prescriptions are prepared through a microprocessor-controlled visual display with a Centronics Data Computer Corp. 306C printer attached.

The data base at the central site retains all prescriptions for a period of two years (inactives are automatically deleted from the system). Patient profiles and prescription re-

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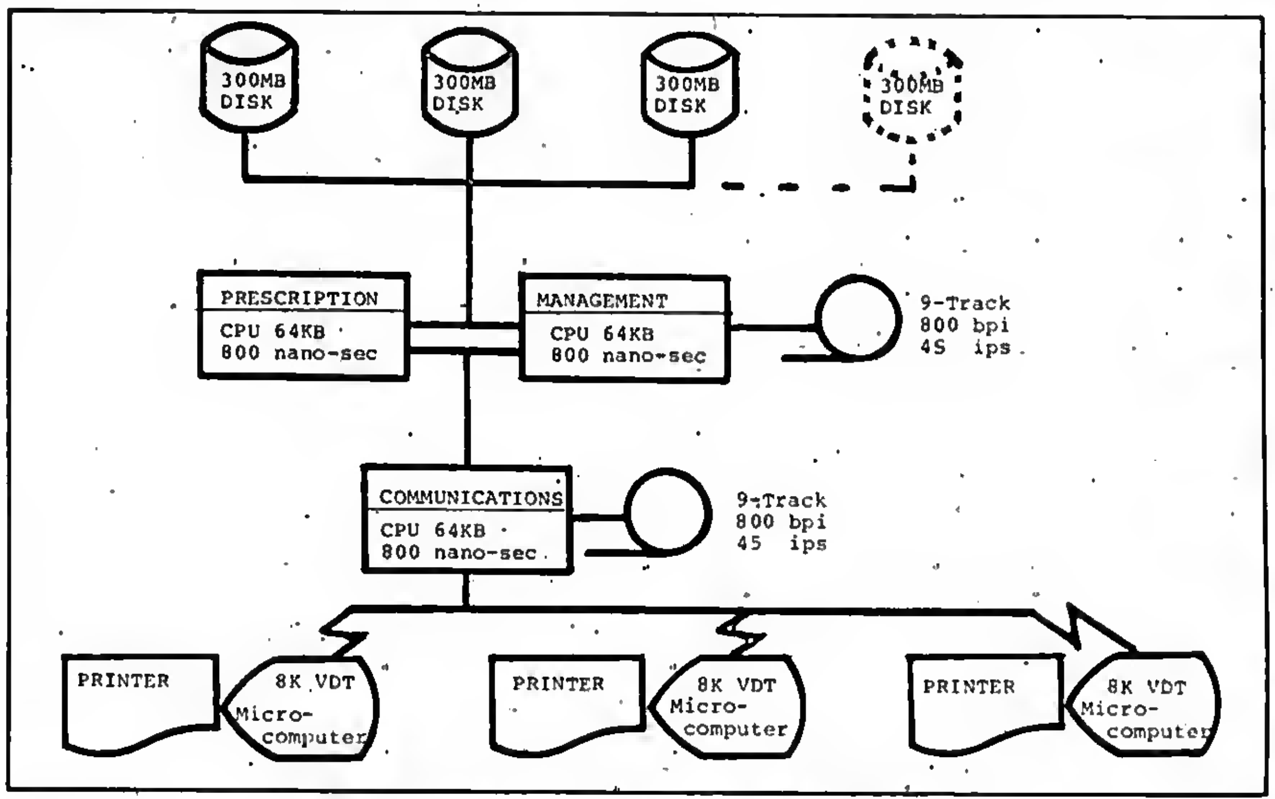

RX Information Center's Distributed System

Mini Bits

Meet to Explore Office Automation

SAN FRANCISCO — A conference for those considering combining word processing and DP in their offices will be given by the American Institute of Industrial Engineers (AIIE) in two cities this fall, winter and spring.

The first day will include a survey of functions and systems of the automated office, the organization said. On the second day, concurrent workshops will examine word and text processing technology and systems and DP, software and communication technology trends influencing office automation equipment. They will also cover selected case studies.

The conference will be given here Sept. 28-30 and in Washington, D.C., Dec. 7-9 and March 13-15. It costs $265 for AIIE members, $295 for nonmembers and $195 for teams. Information is available from the organization at P.O. Box 3727, Santa Monica, Calif. 90403.

Floppy Gets Bootstrap Loader

SANTA CLARA, Calif. — Data Systems Design's DSD 210 Digital Equipment Corp. compatible floppy-disk system has been enhanced with the introduction of a hardware bootstrap loader.

The bootstrap capability allows a DEC PDP-11 or LSI-11 user to load RT-11 from the diskette unit with a single command. The bootstrap instruction sequence is contained on a programmable read-only memory which is a part of the DSD 210 interface, the firm explained.

The DSD 210 including the bootstrap feature is available 30 days after receipt of the order and costs $3,295, the firm said from 3130 Coronado Drive, Santa Clara, Calif. 95051.

Printers Interfaced to PDP-11

AUSTIN, Texas — Houston Instrument has interfaced its 8200 series line printers to Digital Equipment Corp. PDP-11 minis through the use of a DEC Unibus compatible interface and cable, the firm said.

The interface mounts in a four-slot wide card position in the mini. It contains all the logic and hardware necessary to control the printer and respond to the Unibus commands, according to a spokesman.

The interface option costs $1,150. The 80-column 2,400 line/min 8210 printer costs $3,450 and the 132-column 1,400 line/min Model 8230 printer costs $3,785, the company noted from One Houston Square, Austin, Texas 78753.

Small System Tracks Beer, Wine

By Esther Surden
CW Staff

GRAND RAPIDS, Mich. — Wine and beer, although similar in alcoholic content, are quite different when it comes to keeping track of orders and inventory.

This, combined with the increasing complexity of a business that must abide by tough state and federal regulations, prompted Kent Beverage here to seek help through purchasing a small business system.

The firm is a beer and wine wholesaler with about 560 accounts, according to its president, Larry Gary.

"Wine is usually a presell inventory, which can be kept on the computer. The system generates a picklist and the wine is directed to the correct customer," according to Kevin Gary, general manager in charge of the small system.

Beer is a direct-sale item so it is necessary to keep a truck inventory log over age of a consigned item. The beer salespeople make direct sales and receive cash. After the cash is brought to Kent headquarters, it is counted out manually and the resulting numbers are input into the mini via a CRT terminal. The system cost-verifies the amount and prints out a sales analysis, Gary said.

Increasing complexity in the alcoholic beverage business prompted the firm to look for a small system, the general manager said. "There are a huge number of laws wholesalers have to follow. For example, we have to keep seven years of data storage and you can imagine the size of the data file."

Both Garys looked at several systems before choosing their present model, Keven Gary noted. Cascade Data, Basic Four Corp., Litton, Burroughs Corp. and IBM all were contacted, and the company looked at several on-line service bureaus. "But I was not satisfied with any of the programs," Gary said.

He explained he was looking for an application package that would completely take care of his problem. The general manager had taken several computer courses in college and knew what his firm needed in a software system.

Finally, the wholesaler contacted a neighbor who happened to be a distributor for Randal Data Systems, Inc. The neighbor's firm, Minicomp Systems, Inc., was willing to write the basic programs and Gary decided to write the rest, using his

(Continued on Page 33)

Definitions Sort Out Chip Memory Functions

BOSTON — Almost everyone in the computer industry would agree that minicomputer memory technology is changing rapidly. No sooner did the mini move from core to large-scale integration technology with its plethora of read-only memory (ROM), programmable read-only memory (Prom), random-access memory (RAM) and erasable programmable read-only memory (Eprom) chips than it began looking toward charge-coupled devices and bubble memories on the horizon.

Where are we today? Bogged down in a quagmire of acronyms and buzz words, with even the most sophisticated user seeking a simple explanation for these abbreviations. In response to several reader requests, CW is presenting a few of these definitions as they appeared un a catalogue designed for hobbyists and compiled by the Computer Warehouse Store.

Memory can be grouped into two major categories — read-only memory and read/write memory (misnamed random-access memory). Both categories of memory are actually random-access; that is, any address may be immediately accessed.

ROM — The process for making ROMs requires the creation of an expensive mask, but copies of the ROM are themselves inexpensive. This means that for large volumes the ROM is ideal.

Any ROM is nonvolatile; that is, it keeps its memory contents even when the power is shut off. This makes it extremely valuable as a bootstrap for setting a system started from a power-up condition. It is also used extensively in the simple monitors that permit a user to examine, modify and run programs in memory. The user may not change the contents of the ROM.

Prom — This is a special memory which can be programmed using electrical means. It does not require the expensive mask process but, once programmed, it performs exactly as an ROM. It is reasonably inexpensive in small quantities and makes a good memory for low volume systems.

Eprom — As the name implies, this is a Prom that can be erased and reprogrammed. It costs more than the Prom, but with the capability of being erased and used over again, it may actually be cheaper to the hobbyist or during system development.

RAM — The microcomputer always needs some memory that it can alter to maintain data. For certain applications, the amount of RAM memory may be extremely small, perhaps only a dozen or so bytes for a dedicated instrument or simple process-control system. Other applications may need tremendous amounts of read/write memory, thousands of bytes, to hold both programs and data.

The advantages of RAM memory are that it can be modified by the computer and it can hold data and programs. The disadvantages are that it is more expensive than the ROM types of memory since it requires write circuitry as well as read circuitry, and it is volatile; that is, it loses its contents when power is turned off or is seriously interrupted for a brief duration.

Minis Expedite Prescriptions

(Continued from Page 31)

cords are retrievable by the prescription number or by a combination of surname and birth date. A prescription is accessible, regardless of where originally created, by any drugstore in the network.

One print cycle produces the label for the vial directions, a three-part customer Medicare receipt, a laboratory file copy and a cashier's stub. The construction of the form alone, with hardware modifications to the printer, took Dionne, Centronics and Paul Finlayson of Cygnet V.P. Systems three months to complete.

Communications Lines

The network extends from Montreal east to Sherbrooke, north to Lac St.-Jean, west to St.-Jovite and south to Valleyfield. Polled multidrop, private and Dataroute 1,200 bit/sec telephone lines are used for communications.

Central-site hardware consists of four identical Cygnet Series 2002 minicomputers. Three are used as prescription CPU, management CPU and communications CPU. The fourth is redundant and serves as backup to any of the others.

Disk Drives

Disk drives are 300M-byte Ampex units dual-channeled to the prescription and management CPUs. Failsafe procedures have been implemented through a magnetic tape audit of all transactions processed during the day.

"In fact," Dionne said, "with the redundant hardware plus the fact that two CPUs can handle the total requirements with only a degradation in response, we have the ultimate in backup security."

Three hundred line/min, OCR-A-font chain printers serve the government welfare reporting. Reports are prepared during the evening and forwarded to the individual pharmacies on a daily basis. The average number of prescriptions processed daily by a pharmacy ranges around 500.

How to jump into key-to-disk, without giving up your

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

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Bar-Encoded Labels Simplify Librarians' Duties

By Joyce Kamanitz
Special to CW

NEWTON, Mass. — Although bar-encoded labels have run into problems in some applications [CW, May 30], they are well-suited to library applications.

In fact, libraries across the U.S. and Canada have been using bar-encoded label's since 1972 to identify their patrons and books.

Promptly dubbed "zebra labels" by the librarians, the labels help the library's minicomputer turnkey system keep track of the books in each collection and prepare reports on the collection's usage.

The system works as follows: Every library patron receives a zebra label on his library card that uniquely identifies him to the system. Each book also has a zebra label attached to it.

To perform a checkout, the librarian simple reads the patron and book zebra labels with an optical scanner to make the connection between the two for the duration of the loan period. For checkins, the librarian scans the book's zebra label and the system removes the connection.

Behind the scenes, the system checks for conditions that formerly took hours to determine, if they were checked at all.

For example, by identifying the title connected to the zebra label, the system can tell if any holds have been placed on a book presented for checkin.

If so, the system notifies the librarian and the book is set aside to be picked up by the next patron who has requested it. The system then sends a notice to that patron informing him the book has been returned.

Library staff and patron reactions have been very favorable because this combination of minis and bar codes makes checkout and checkin faster and more efficient. Scanning the patron's zebra label instructs the system to examine the patron's borrowing status. Thus, the librarian knows immediately whether the patron requesting a book has exceeded the library's delinquency thresholds.

The librarian then determines whether to allow the patron to check out the book, thus rewarding borrowers who follow the rules and warning those who don't that privileges may be denied.

Without the on-line access to the data base facilitated by the zebra labels., the librarian does not have the patron's borrowing status readily available.

As part of each checkout, the system updates the circulation count for the type of patron and the type of book in the transaction. Librarians thus determine the types of books being circulated and the level of usage by patron groups. With these statistics, the librarian can ensure that the library purchases the kinds of books its patrons want to read.

The first part of the patron and book zebra labels is a library code. When the librarian scans a zebra label, the system always knows the branch at which the patron is registered and the branch which owns the book.

In library systems that honor branch libraries' cards, this feature enables the system to automatically keep track of the number of checkouts to patrons of cooperating libraries and to immediately identify any books erroneously returned that belong to other branches.

Bar-encoded labels in the library application have not run into the problems facing other applications, notably the supermarket systems.

Since item pricing is not an element of normal library transactions, objections based on item pricing do not apply.

Kamanitz is a technical writer with CL Systems, Inc., a turnkey library system vendor in Newton, Mass.

System Tracks Inventory Flow

(Continued from Page 31)

computer training. "I realized that no one really had a package for beer and wine distributors, so price dictated that we get this system," he said.

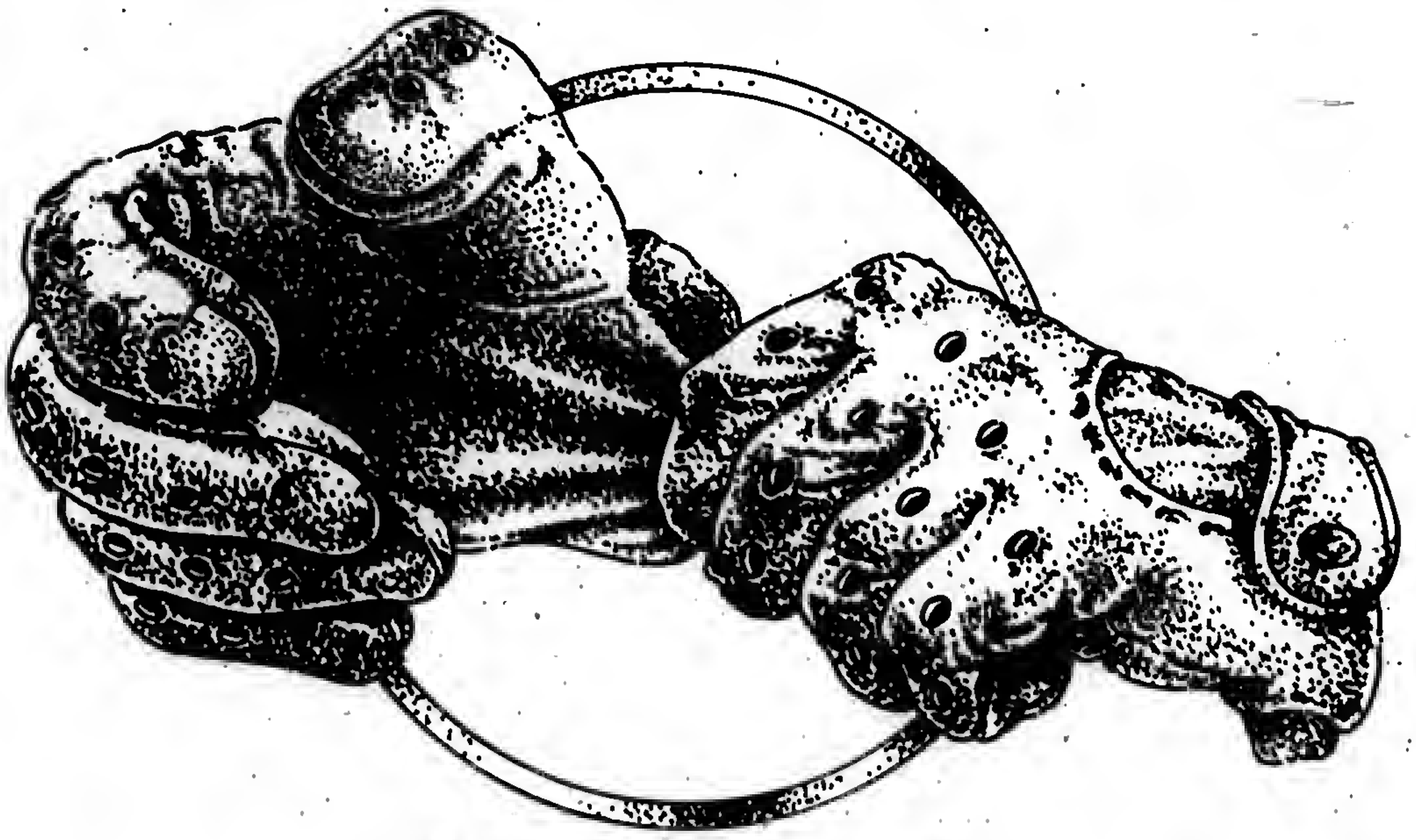
The system includes a 70 line/min printer and floppy disk. Although one CRT is presently used on the system, Kent has another on order and has decided to switch to hard disk for more capacity. The switch requires a CPU upgrade, he noted. Initial cost was $17,000.

The firm doesn't have a hardware maintenance contract with Randal, Gary noted, because he chose to do all the maintenance himself. "The Randal equipment is as good as any other piece of hardware. Downtime has been only 1/4%," he stated. The only problem the firm has had was a burned out printer motor. "Service is fantastic — we get spare parts the next day."

Because the system is located in a high dust area, "I installed our own filters around the compressor," Gary noted.

He programmed the system in Randal's Basic, which includes some variances that make the language simpler to use in writing programs, he said.

Data Base/Data Communication



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Orderly Selection Route Ensures Best Decision

By Joseph Dresnok Jr.
Special to CW

NEW YORK – "How can we expect to merchandise in a constantly changing environment when our 'most current information' is 45 days old?" is a question asked by many small businesses.

The problems are easy to define: inaccurate sales and inventory informtion, reports so late that they are virtually useless and lack of control of the information by users head an uncomfortably long list.

Seligman and Latz, Inc., a company dealing in beauty services and products, needed to implement a solution for these problems which would serve the distribution function for the cosmetics and beauty salon products divisions, as well as provide merchandising information for the fine jewelry division. The solution had to be tailored to the varying capabilities and specialized requirements of each of the three divisions to be served.

To organize the decision process, a hierarchy was developed. After documenting "musts" and "wants" from the users, the decision hierarchy became:

- Identify the optimum mode of operation (batch, remote batch, on-line).
- Specify hardware type (mainframe, minicomputer(s), data collection devices).
- Select the communications method (if appropriate).
- Evaluate vendors and recommend one.
- Determine the organizational structure that optimizes successful implementation probability.

At each decision level in the hierarchy, top management was involved with the intent of gaining its insights and obtaining concurrence. We quickly realized that involved, well-informed corporate management would be an invaluable asset in reaching an optimum solution. Budget revisions, when necessary, became intuitively obvious to everyone involved in the decision process.

Based on the first-level decision, the minicomputer was selected as the hardware type. The necessary larger mainframe would have exceeded the acceptable cost limit and data collection devices could not satisfy the on-line requirement selected in the prior decision level. A cost evaluation to corporate management detailed the reason for the decision to use minicomputer capability.

The communications mode selected was 9,600 bit/sec leased lines on the basis that the number of sites is limited and the transaction volume is high.

The minicomputer vendor evaluation became the most difficult part of the investigation. Again, "musts" and "wants" were identified, this time by the management level of the MIS department. "Musts" included the following:

- Ansi Cobol capability to maximize in-house programming capability with a minimum of retraining.
- Data base file handling techniques to optimize the access and utility of data by the users.
- Single source responsibility from the CPU manufacturer to limit the "finger-pointing" anguish to the CPU vendor and the telephone company.

RFP Questionnaire

An RFP was developed which included a hardware and a software questionnaire. Sent to seven major vendors, one submitted a "no bid" and one exceeded the acceptable cost limit (which was now broken down by hardware, system software and applications software.) Of the five remaining vendors, only two were able to meet the "musts." The final evaluation was performed on the basis of two separate rating schedules.

The final decision in the hierarchy was to determine the best organizational structure for implementation. Based on our environment and the importance of timely installations, the project team approach was selected.

It is important to note that many of the alternatives that were not selected were reasonable and would have offered many advantages. In retrospect, we are pleased with our decision and have received the endorsement and cooperation of top management.

Dresnok is director of systems at Seligman and Latz, New York, N.Y.

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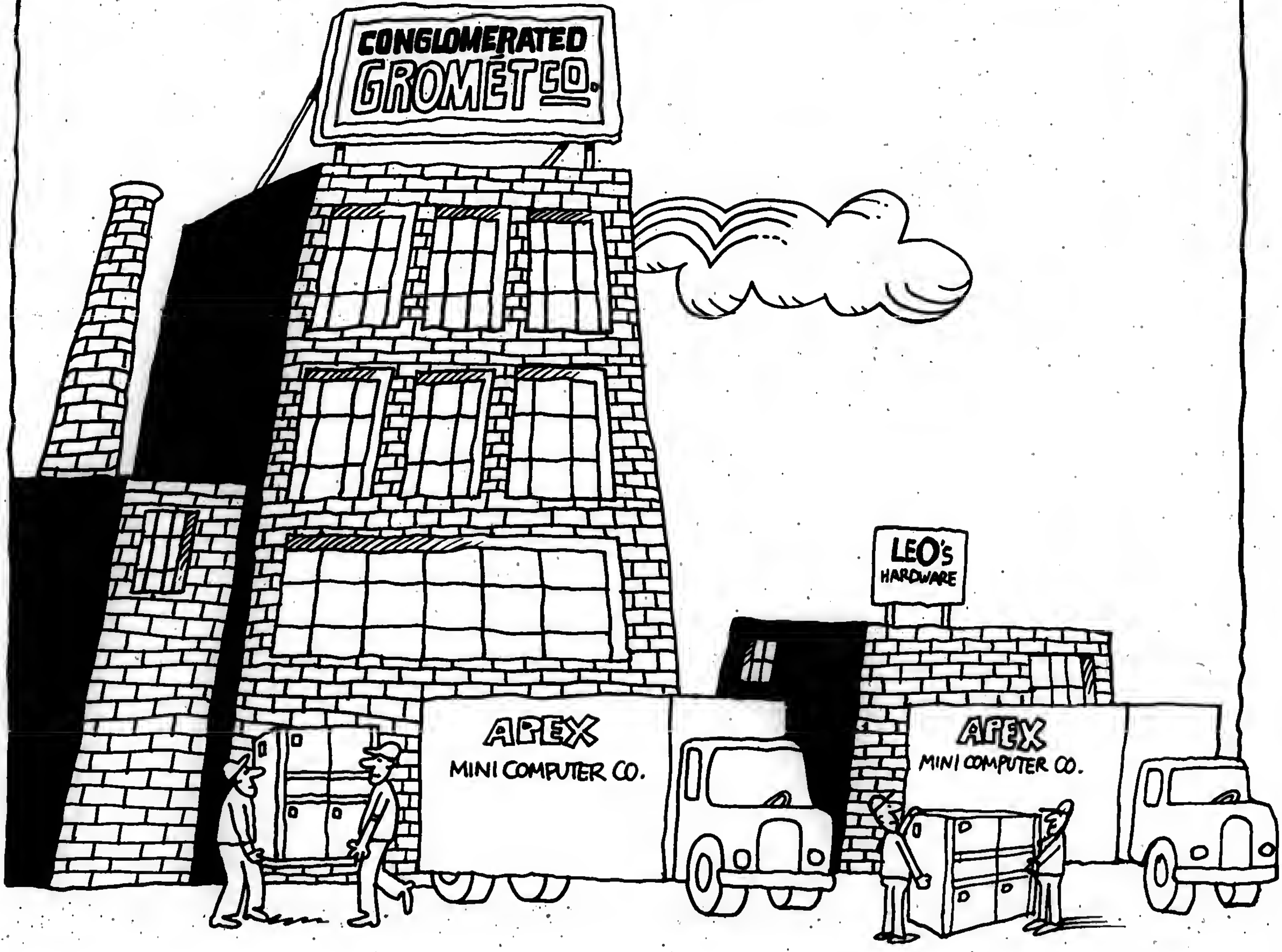
A Computerworld Special Report

Edited by Esther Surden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Small Processors the Answer

Firm Uses Net to Solve 'Saturation' Problems

By David Langley
Special to CW

VANCOUVER, B.C. — In 1974, Finning Tractor and Equipment Co. had a critical DP problem.

The company, a heavy equipment dealer, maintained a parts inventory worth $15 million — some 250,000 different line items — at full service branches and depots throughout British Columbia and the Mackenzie Valley region of the Northwest Territories, from the Canadian/American border to the Arctic Ocean. Processing 3,300 orders per day and servicing such a vast territory caused a formidable logistics and DP problem, specifically for DP manager C.A. Harris, who recognized the "saturation point" had been reached on the company's Honeywell 2040-A batch processing system.

So the task of investigating the DP solutions to this problem was undertaken. Front-ending the Honeywell system with a communications processor, perhaps a minicomputer, was one of the first avenues explored, but the ensuring operational upheaval and software conversion diminished the attractiveness of this approach. The Honeywell solution at that time was also limited to fewer terminals than the 100 — both CRTs and line printers — that Finning wanted.

A second approach was a traditional "upgrade" one, and large-scale processors from Honeywell, IBM and Digital Equipment Corp. were evaluated. However, Harris felt this route would merely establish another "saturation point" further down the road and was not sufficiently flexible to accommodate a variety of future plans. Neither proposal adequately addressed the problem of on-line system reliability, he said.

The eventual decision was that a network of small processors coupled with the appropriate software tools would provide the most effective solution and at a fraction of the cost of a large mainframe system. Data General was selected as the primary supplier (DEC provided the remote terminal printers) primarily Harris said, because of the price/performance characteristics of the Eclipse and Nova processors and the availability of an extensive data base file management system, Infos.

Experienced Design Team

The major supplier having been chosen, Harris then established a special "computer systems design group" to develop and maintain software products to support the envisaged network. Doug Dyment, former vice-president and software designer for Data General Canada, is manager. Another senior member is Michael Haines, former Data General systems programmer. This group, building on their experience, provided a "margin of safety" that practically ensured the success of the most critical portion of the project, Harris stated.

The network currently utilizes 29 processors, six of which communicate over a DG high-speed data channel link installed at the central site in Vancouver. These local processors — two 256K-byte Eclipses (C330, C300) and four 64K-byte Nova/3s — are used to support the data base, most application programs, training and develop-

(Continued on Page S/6)

Mini Acquisition Seen Serious Step

By David Hyatt
Special to CW

The process of acquiring and implementing an effective business minicomputer does not have to be quite as mysterious as users have been led to believe. Justifying, selecting, manning, installing and converting to a business minicomputer can be a manageable experience.

One of the most abstract and most difficult questions to answer is: "How do I know if I need a business minicomputer?"

One important, practical way to know is if the competition is automating and is able to underbid the company on contracts; then maybe a business minicomputer can help.

Business minicomputers are designed prinicipally to serve the business DP needs of small companies. In addition to their use in small companies, low-cost business minicomputers are also being used in some of the nation's largest corporations for:

- Local processing for branch offices or divisions.
- "Dedicated" applications such as accounts payable.
- "Intelligent terminal" applications as part of a data communications network.

Feasibility Study

The process of investigating, selecting and installing an in-house business minicomputer, if done carefully and correctly, will be time-consuming and costly. Therefore, don't take on these activities lightly and casually. A wrong decision can virtually ruin the internal administrative functions of the organization and have serious financial consequences as well.

As part of the feasibility study, the user should survey the available equipment from appropriate computer vendors that are likely to be able to satisfy the requirements. The user will probably find out there are a number of different approaches to solving the same problem.

One vendor may offer magnetic striped ledger cards as a method of data storage. Another vendor may say that ledger cards are a thing of the past and too slow and offer magnetic tape cassettes as an alternative.

Obviously, there are pros and cons to each. For example, while ledger cards are slower than tape cassettes, they do offer an immediate history of an account. On the other hand, tape cassettes can be sorted in various ways.

The first step in the process of investigating any new computer is to perform a careful audit of current operations and all the procedures taking place now. Time should be spent on defining reporting requirements, specifying application areas, determining data volume and identifying time constraints.

Typically, a variety of minicomputer representatives will be more than willing to make "surveys" of the present accounting functions. There's nothing wrong with accepting their offers, as long as the user recognizes their obviously biased viewpoints.

While investigating the present workload is essential, another very important element to investigate is any future DP requirements of the company. The system should provide some growth capability.

In order to get serious with a vendor about obtaining equipment, the user must have a proposal. In order to obtain proposals, the user must document his needs in a Request for Proposal (RFP) after the careful analysis of the workload and preliminary survey done earlier.

After receiving the competitive proposals, the user should evaluate them with four objectives in mind: Is the proposal complete? Is the information valid? List any questions and sum-

(Continued on Page S/8)

32-Bit Word Machines May Dominate Future Market

By Jean J. Bartik
Special to CW

Several years ago, when CPU hardware was the major consideration in the overall cost of a computer system, the short word length made sense. The short word length meant less hardware, thus less cost.

Today, however, the CPU hardware represents an ever smaller portion of system cost — overshadowed by the cost of memory, peripherals (big disks and fast magnetic tape) and software.

The traditional limitations of minicomputers — narrow address space, small maximum memory capacity, low precision and limited instruction set — were largely related to the short word length. These limitations gave users considerable grief when most programming was done in Assembler language.

This is no longer true. Most programming today is done in a higher level language — Fortran, Cobol, PL-1, APL, Basic, RPG-II. Furthermore, the short word length (and its problems) in the popular older minicomputers is largely hidden from the user behind large amounts of software.

The OS-8 operating system and the hefty software it supports make the 12-bit word length of Digital Equipment Corp.'s PDP-8 irrelevant for most users, who are concerned only

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On the Inside

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Foreign Office Effectively Joins Minis, T/S

By James A. Harper
Special to CW

DENVER — When corporate headquarters of Johns-Manville Corp. (J-M) cut the time allowed for monthly accounting closing processing from 12 work days to six for its European operation, a new DP solution had to be found.

That solution combined extensive use of minicomputers with a time-sharing service bureau.

The J-M European operations, located outside of Paris and including the Middle East and Africa, began using a service bureau in France in the late 1960s to do payrolls, sales and sales reporting and cost of sales for the UK, France, Germany and Italy, as well as general accounting for the UK and France. The operations experienced significant growth, added new facilities and the business became more complex.

The service bureau facilities could not respond to the needs of the production people nor to the increasing demands made by marketing or finance. The final blow came when corporate headquarters here in Denver cut the time allowed for monthly accounting closing processing.

Assumptions, Objectives Compiled

An information systems program was established in 1974 and began with my arrival in Paris on May 1. Our first task was to interview management at all levels to determine how they ran their business, what information they considered critical in the running of their areas of responsibility and what they felt the future would bring in terms of their responsibilities.

The system objectives were to provide all levels of division management with the information they determine to be necessary to plan, control and measure the activities within their responsibility in the most timely manner.

The service should gracefully respond to new demands for information or response requirements, resulting from growth, organization change or newly defined requirements. It should be independent of location, i.e., capable of serving all J-M European locations requiring services without penalizing by cost or turnaround time a location situated remotely from the DP facility. In effect, the service must give every location equal access to DP in terms of cost and response.

Also, it should be flexible enough to respond to the diverse requirements of different locations, for example, interactive response vs. batch or scheduled, seven day, 24-hour service where required without cost penalizing those who don't need that high a response.

We also wanted to provide corporate headquarters, in a timely manner, with the data necessary to consolidate division performance with corporate data and the information needed to evaluate division performance.

Corporate departments, such as accounting, auditing, etc., as well as division management located in the U.S., needed to have access to management information equal to the access provided locally in Europe. Compatibility with corporate data wherever possible had to be ensured.

Two Information Needs

To do this we characterized demands for information into two categories: operating information and management information. We further characterized operating information as that information needed to conduct day-by-day business.

For the latter type, which was relatively constant rather than cyclical, we deployed minicomputers. For management data, which we defined as cyclical (monthly accounting closings, monthly operating reports) where demand for computer resources and people would fluctuate widely and where the recipients could be more than 5,000 miles apart, we opted for GE's

(Continued on Page S/16)

For Distributed Net

In-Depth Study Leads Insurer to Minis

By Esther Surden
CW Staff

HARTFORD, Conn. — Fireman's Fund Insurance Companies of San Francisco recently went through an in-depth selection process before it chose minicomputers for a distributed processing application, according to Mel Duraeo, vice-president of the Computer Services Department.

Speaking at a recent seminar here, Duraeo described everything from the firm's philosophy toward selection to the methods used to arrive at the final choice — Computer Automation's (CA) Syfa systems — in a distributed processing network.

The firm, which has three IBM 370/168s at a central site, also has 49 branch offices, 45 of which are now automated. The Computer Services Department has total responsibility for what equipment will be selected and when it will be installed. It interfaces with the Value Analysis Department, which is part of the controller's office, Duraeo explained.

"The user is kept completely out of the selection process and so are the applications people. In a lot of cases, the applications people end up having to design systems that fit our hardware. In a lot of cases, we are significantly ahead of the applications area," he said.

Duraeo pointed to cost as a very important but not the most important factor in selection of equipment. Fireman's Fund is more interested in maintenance capability, especially for "minicomputers that are going to be distributed to dispersed locations," he said.

Terminal Troubles

Originally each of the branch offices was supplied with GTE Information Systems Novar terminals, described as typewriter-like terminals with a cassette.

"We had significant problems with the vendor," Duraeo stated. "When the vendor became very interested in helping us they did not have the resources to help us. I actually sat in a meeting with design engineers, maintenance engineers and software people and within a space of two hours got seven different answers to one technical question on how something worked," he said.

When replacing the Novars the company did an exhaustive study including a thorough analysis of whether it should stay with the non-intelligent terminal or whether it should go to minicomputers. After it settled on minis, phase I and phase II requirements were defined.

For Phase I the firm required a system that would perform data entry and editing batch store and forward, as well as process over night, transmit the output store it on disk and print. Phase II included all the Phase I capabilities plus concurrent batch processing online to the host and local data base processing inquiry and update, he said.

"At that time we concluded that our users were not ready to use the Phase II facilitiies," Duraeo explained. Because the Novar equipment had been very labor intensive "we were willing to pay more for the computer hardware in order to reduce people cost." So for Phase I, which was to last an estimated 18 months, the company took a short contract with Four-Phase Systems, Inc. for a data entry system.

Although the company experienced some problems during the development cycle with the Four-Phase systems in general, it found "Four-Phase to be very good people. Maintenance has been great, uptime has been in the 99% plus range and management is extremely responsive," Duraeo said.

Although the firm hoped to stay with the same vendor for Phase II, it found it impossible because Four-Phase had operating system and hardware problems, Duraeo said.

"They had built-in problems in their operating system in handling multiple applications and we spent a significant amount of time helping to correct those problems for the future," he added.

By the time Phase II was ready for implementation, "we were really quite delighted that what we were calling Phase II had already been given a name by the computer industry. It was 'distributed processing,' " Ben Bevis, assistant vice-president, said.

Phase II began in March 1976, about four months after the Four-Phase systems were installed. "The selection process culminated in November of

(Continued on Page S/18)

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Comparative Data Can Be Misleading, Costly

By Jon David
Special to CW

The truth, the whole truth and nothing but the truth. The philosophy behind this oath required of witnesses should be applied in considering a minicomputer system.

The typical head of a smallish company, say a company in the $2 million to $20 million range, is normally a good businessman. However, today, many businessmen are still unqualified to make effective technical evaluations in the minicomputer area. They frequently choose unworkable or very poor systems because they cannot distinguish meaning from data.

The easiest area in which to compare computer systems is hardware. Computers have cycle times, disks have storage capacities, line printers have speeds and the like. The hardware descriptive parameters have some validity in comparing raw hardware; when buying a working system, however, the hardware statistics frequently have no meaning or, worse, are misleading.

A 15-million-character disk can hold one and a half times the data of a 10-million-character disk. What does this mean? If the system with the 10-million-character disk stores data with no waste, the 10-million-character disk will hold 10 million characters of data.

At the same time, the 15-million-character disk can be part of a system that stores data in, for example, 500-character blocks and blank fills incomplete blocks. Such a system would take 500 characters of disk to store 10 characters of data and would yield a data storage capacity of only 300,000 characters. While 15 is certainly more than 10, 300,000 is also noticeably less than 10 million.

Hardware statistics, even when true, can paint a very misleading picture.

Software Equally Confusing

The software area offers less hard data on which to make comparisons, but is equally prone to confusion and misinformation.

Let us assume two vendors offer software which sounds exactly the same with one exception: the first manufacturer also offers Isam. Obviously, the user is getting something more from the first manufacturer.

Isam is the mnemonic for indexed sequential access method. It is a method for storing and accessing data on disk. It is very useful in certain applications and even necessary in others. At the same time, however, it is quite often unnecessary.

Utilizing Isam has two side effects: the system automatically utilizes disk areas for index storage and program execution with Isam input/output is slowed down (relative to direct disk access programs). If you utilize Isam when you do not need it, you will both lose disk data storage capacity and slow down the response of your system. The Isam you got "free" can prove to be quite expensive.

Occasionally, a businessman will go beyond basic hardware and software comparisons. This is a good thing, because there are other very important areas. Unfortunately, here too, one can easily be misled.

I was recently speaking with a company that had a strong leaning to the equipment of one particular manufacturer. Since that equipment was not what I would have used, I asked the user why he so favored that particular system. He told me he felt maintenance was of prime importance and that a technical review had specifically stated that the manufacturer provided a national average response-to-complaint time of one hour.

My experience caused me to seriously doubt that statistic. Regardless of the validity of it, however, mean time to respond is not mean time to repair, and national averages do not reflect specific local performance. As a matter of fact, I happened to know a user in the same area who had systems from this particular manufacturer and had had equipment down for periods of three and two months the preceeding year.

The proliferation of comparative review documents and the plethora of computer

(Continued on Page S/25)

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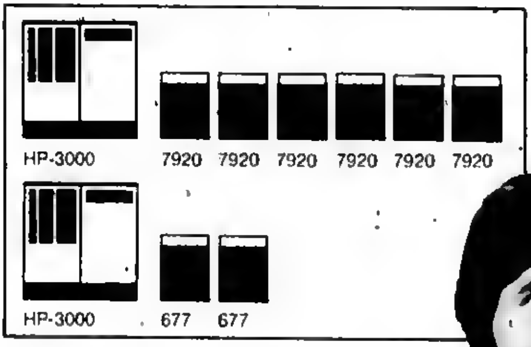
Memorex, long known as the "memory/excellence" people in the IBM-compatible marketplace, has helped us make the HP 3000 a sensible, reliable, cost-effective alternative to IBM mainframes. Perhaps more than anyone else, Memorex has "written the book" on the successful installation of disc subsystem add-ons. They have, in large measure, shown the way in making "mixed vendor" systems preferable instead of just tolerable. They've done it with support—before, during and after the subsystem installation.

But most of all, Memorex has done it with the product.



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Particularly if they are Memorex 677 drives. This 200 megabyte, single spindle, disc storage drive is the product of three generations of Memorex disc experience. And it is the one product that has been installed more often than any other of its kind—count them, over 15,000 units at work for customers today.

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Thanks to Microcomputer Systems MSC-1000 disc controller, which emulates the presence of the biggest drive

Results in 'Substantial Savings'

Independent's Language Speeds Programming

OAKLAND, Calif. — Granny Goose Foods, Inc. here, a snack food manufacturer, has converted from an IBM 370/135 to an NCR Century 151 small business system programmed in an independent vendor's programming language.

The conversion from the larger 370/135 was made to reduce all DP costs, John Barnhill, programming manager, noted. The 370 was transferred from Granny Goose to the company's parent firm — Del Monte Corp. — and replaced with the smaller system.

At that time there were still several incomplete programs that could not be run on the Century system, so the company bought time from an IBM user. This continued for some time, while the company contracted with some independent vendors to write the programs for the new system.

One of the vendors, Century Analysis, marketed a language called Pass/3 designed for the NCR Century system, Barnhill recalled. The use of the language sped up the writing of the remaining systems so much that Granny Goose opted to use it exclusively for its own operations as a means of reducing systems development costs, rather than using the NCR Century language, Neat/3.

The staff of two programmer/analysts attended a one-week Pass/3 class in October 1976 and since that time has used Pass/3 exclusively. About 60 programs have been written and put into production.

The conversion is complete, Barnhill stated, and the firm will soon begin additional development in areas that up to now had been considered projects for some point in the future.

"The time spent writing and debugging programs is greatly reduced, resulting in a substantial savings," Barnhill noted.

Using a multifunction language that can be used to write any type of program — captures, updates, reports and user-defined programs — from very limited input specifications helped speed operations. If desired, Neat/3 source listings can be produced as a byproduct of the language, he noted.

Granny's Hardware

The hardware at Granny Goose includes a Century 151 with 64K of memory, two disk drives with 30M bytes each, two tape drives, a train printer and a card reader. It is used to run 10 different accounting systems in batch mode, he noted.

Two of the three systems that were important during Granny Goose's conversion were salesmen's accounting and plant reporting. The first was a relatively simple system, consisting of 18 programs designed to keep track of commissions and inventories on a weekly basis.

After attending programming classes at the independent vendor's school, Ellen Dudley, one of Granny Goose's programmer/analysts, began writing the programs in Pass/3. In approximately two months, all areas of the system were operational, written essentially by one person.

Fewer Cards

"Every line of coding I wrote in Pass/3 would have taken much more in Neat/3," Dudley explained. "There were fewer cards to keep, creating less chance for error."

This savings can be seen in the fact that the system was written in 2,035 Pass/3 lines, which generated 12,064 lines of Neat/3.

Another system, written by Tony Flusch, is essentially a finished goods inventory, keeping track through ratios and theoretical concepts of all material and labor necessary to produce Granny Goose's existing product and providing statistical analysis for future products.

Flusch wrote all 35 programs inapproximately three months using Pass/3. His 1,541 lines of Pass/3 coding generated 16,244 lines of Neat/3.

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Disc Subsystem Comparison Chart

Feature	HP 7920	MSC-1677
Software Transparent under MPE/DS-3000	Yes	Yes
Microprogrammed Controller Architecture	Yes	Yes
Full ECC (error correction)	Yes	Yes
3330 Disc Technology	Yes	Yes
Capacity per spindle (megabytes)	50	150
Reliability	Good	Much Better
Complete Maintenance Support	Yes	Yes
Price	Competitive	Super Competitive
Number of installed spindles	Less Than 1000	Over 15,000
Operator oriented self-testing capability	No	Yes

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Beyond them, there is us. And our team of HP 3000 experts, backed by a fully functioning HP 3000/II System that can "acceptance test" subsystems, "systems test" spare parts, reproduce failures or anomolies so as to quickly analyze and troubleshoot problems at the system level.

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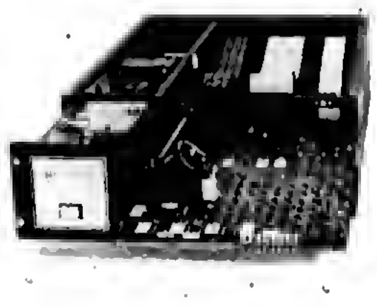
Beyond our individually marketed controllers, we will continue to work with "rocks" like Memorex Corporation developing products like the MSC-1677. After all, wasn't it a rock that helped David take the steam out of a fellow named Goliath?



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Networking Solves Firm's 'Saturation' Problem

(Continued from Page S/2)

ment work, local branch office functions, numerous system utilities and four synchronous multidrop 4,800 bit/sec communication lines.

The remote processors (Nova/2s and Nova/3s, each with a number of CRTs and serial line printers) handle communications, local terminal editing, printer spooling, screen format storage and TWX/Telex replacement for the branch offices. These remote stations may be "down-line" loaded at any time without disturbing normal network activities.

Disk storage consists of three 92M-byte drives, one for the on-line data base, one for software development and the third for backup and data base expansion. Two 9-track and two 7-track tape drives are used for transaction logging, development and Honeywell compatibility.

Infos is the software vehicle for accessing the 600,000 record data base, but the unique nature of the system is due to its homogenous network architecture, employing a protocol of Finning's own design, Harris said. All processing functions, be they system or user in origin, run as "processes." In which CPU the actual execution of a process occurs is defined by a process dictionary, which may be dynamically modified at any time to accommodate changes in software or hardware, he noted.

This lack of CPU dependence means additional processors may be added to he network to improve performance as the transaction load increases and new application systems are added. This is accomplished without software modifications, he indicated.

Similarly, processor failures have only a transitory effect on the system; response simply degrades until the fault is rectified or redistribution of processes is effected, Harris explained. This modular expansion feature means no significant processing limits have been built into the network design. Additional processing capabilities may be added at any time the application load requires it, he noted.

In order to simplify the task of developing and maintaining the network software, Finning implemented an enhanced version of BCPL, a structured system programming language. This compiler generates multitasking code for both Nova and Eclipse processors.

Application programs are currently written using Cfor, another Finning development. This preprocessor, which generates Fortran 5 code, was created to overcome the syntactic shortcomings of Fortran, encouraged structured programming and implement "field variables," a commercial data type. Another Finning software development was M-5, a virtual memory system that provides users with a 2-byte execution space with no special programming considerations, Harris said.

'Once the initial installation problems were ironed out, performance of the DG hardware has been excellent. Retaining an on-site field service engineer has played a major role in smoothing out the operation.'

Performance Excellent

Once the initial installation problems were ironed out, performance of the DG hardware has been excellent, he said. Retaining an on-site DG field service engineer familiar with the system played a major role in smoothing out the operation.

DG's Infos, relatively new at the start, contained a number of bugs which only surfaced when the system went live and the software was thoroughly exercised. But with Finning's help, DG resolved the prolems and subsequent revisions have proved to be solid. Communications facilities provided by the B.C. Telephone Company are stabilizing favorably, Harris said.

The first and most cost-effective application to be implemented was the parts inventory system and it has been successfully on-line for six months. Personnel and account credit authorization followed shortly thereafter, with branch invoicing, TWX/Telex replacement and volume data entry scheduled for completion later this year.

Future Plans

Future plans include word-processing capabilities, a transparent link to another network designed for IBM 3270 terminals, shop floor data collection and fire-detection and access-control mechanisms for remote branch offices.

The network facility was foreseen by Finning as crucial to future operations, regardless of intital cost justification. But the economics already are favorable, Harris pointed out. Elimination of a four-day delay in customer invoicing, the return to Honeywell of now redundant equipment, replacement of the TWX/Telex facilities and the planned elimination of the off-line data entry system will "save" some $35,000 per month. Written off over the next five years, Finning's system will cost $27,000 per month, including maintenance and interest, so the initial net improvement measured in dollars alone is over $8,000 per month.

Langley is manager of computer software marketing for Finning Tractor and Equipment Co., Ltd.

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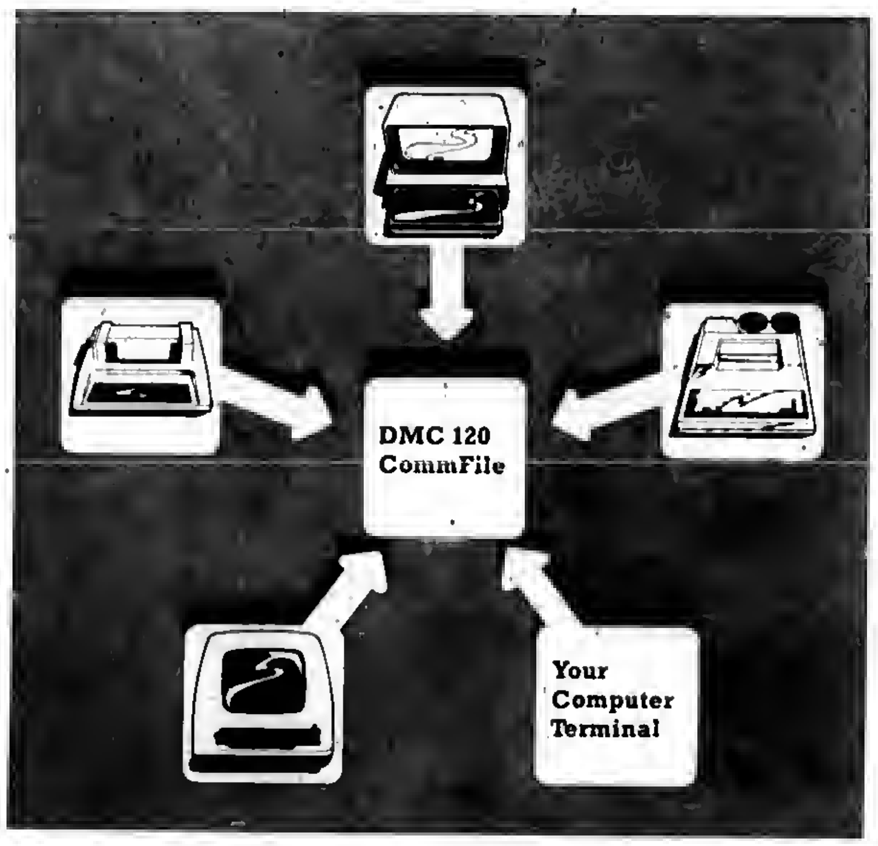

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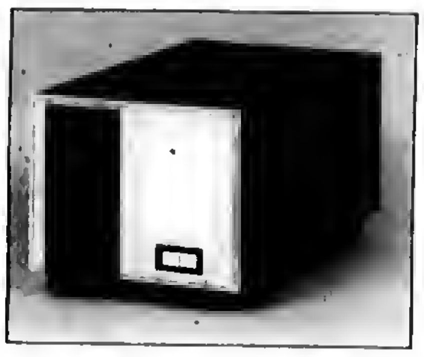

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Revenues Up 8%

Mini-370 Link Streamlines Hospital Lab Work

DES MOINES, Iowa — A Control Data Corp. laboratory minicomputer interfaced to an IBM mainframe at Mercy Hospital's DP center here has helped this institution increase its revenues 8% while reducing paperwork, an official said.

The "innovative" link between the hospital's IBM 370/135 at the DP center and the laboratory's CDC System 17 was developed because "unless the laboratory computer could communicate on-line with our business computer, we felt the investment wouldn't be a significant improvement to the overall procedure," Robert E. Williams, senior assistant administrator, said.

The hospital also wanted a system that could communicate with the 370, not over telephone lines, but over a cable connection, according to Kay Wright, director of information services. To suit the hospital's needs, William Noonan, systems analyst for Mercy's business computer operations, and Thomas Miller, analyst and hardware specialist from Medlab Co., the division of CDC that designed the system, built a prototype interface.

"A hard-wired board in the CDC computer allows the IBM 370/135 to talk to the CDC system as if we were a 3277 terminal talking to the IBM system," Wright explained. Since the installation of this interface, Medlab has built others for other customers, she noted.

Easily Expanded

The hospital decided it needed a laboratory system to cope with the paper-burdened functions in the laboratory. The lab needed a system that was "easy to use and easy to modify," Wright noted. The institution also wanted a stand-alone dedicated system that interfaced with existing instrumentation and one that could be expanded to take care of applications other than laboratory work.

The two systems sit about 1,000 feet apart on different floors of the hospital. Now all patient test data necessary for billing and management reports flows between the System 17 and the IBM mainframe. During the day patient admission, transfer and discharge information is transmitted to the CDC system. The mainframe processes this admitting information entered on terminals located in admitting and emergency room areas and relays it to the CDC computer.

"Once a day, after midnight, the CDC system sends all charge-in data over the same cable back to the IBM computer. This procedure takes about 15 minutes," Wright noted. "There has never been any problem with the system due to the cable or interface," she added.

The hospital believes in an integrated approach to data processing, so the laboratory, hospital officials and the DP department were all in on the design of the system.

"It is important to the success of any new procedure that the participants know 'why' they are performing a certain function," Wright said. "This accumulative understanding, or lack of it, can have a decided impact on the operation as a whole. Consequently, anyone who would have contact with laboratory test data was included in the training."

As personnel became familiar with the new procedures, it became apparent that the computer-based system was having a positive impact on the laboratory's work flow.

"Manual recordkeeping and the amount of paper 'floating' around the lab have been eliminated," Victor Pound, manager of the laboratory computer, noted.

"At both ends of the testing process we are experiencing smoother work flow and a quieter environment. Retrieving test records — once a frantic paper search — is now done by querying the display terminal in the laboratory," he said.

Use of the Medlab system begins well in advance of the actual recording of test results. First, the mini formats docotor's test orders that it reads from mark sensitive cards.

The printout is a "call for collection" or work sheet which lists patients' names, identification number, type of test and volume of specimen needed and the attending physician. This printout is delivered to the nursing units prior to 7 a.m. and is used by nursing personnel to verify which patients will have lab work during the next 24 hours.

A second printout made at the same time is on adhesive labels which technicians attach to the specimen bottles as they make the collection. Patients' names on the adhesive labels are automatically arranged by the computer acording to a convenient "route" through the hospital to save technicians time as they collect specimens.

Back in the laboratory, the technician verifies on the display terminal that the specimens have been collected and are available for test.

To expedite laboratory schedules, the system then produces a list of all similar tests. As each test is completed, the results are automatically relayed to the system and put into the proper patient record there. The technician uses

(Continued on Page S/22)

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Users Urged to Take Mini Selection Seriously

(Continued from Page S/2)

marize the technical content of the proposal in a standard manner that facilitates direct comparisons among vendors.

Specific Factors

The critical factor for judging a business minicomputer's useful speed is the speed at which the input and output devices operate. Extending the system is another major consideration in the evaluation process. Thus, one should consider a machine which accurately approximates current requirements, but which can easily be expanded to meet future demands.

A critically important area of evaluation is software. Vendor's claims and promises concerning the availability and capability of software should be carefully checked, particularly for software that has been announced but not yet released. Vendors frequently fail to live up to their marketing publicity or timetables for delivery.

The availability of reliable and qualified equipment maintenance is also critical in the business minicomputer environment.

Other factors include:

- Availability and cost of support for conversion assistance and training of company management.
- The location and availability of backup equipment, machine time provided for program testing prior to installation of your computer system and the extent of software documentation (particularly operator instructions).
- The trade-offs involved in the lease/rental/purchase contract offerings.

Other costs must also be considered. For example, one or more new employees might be needed to run the system and supplies, office space and overhead costs must also be included.

Added to these recurring annual costs should be the one-time costs of any initial conversion, any vendor support separately charged for and any delivery costs, taxes, etc. In some cases, these one-time costs can exceed 50% of the first year's cost of running the business minicomputer system:

The act of finally selecting the vendor and equipment configuration actually consists in most cases of a careful review and synthesis of the results of each major phase in the evaluation procedure. In most cases, a clear pattern of superiority will emerge.

Conversion, Installation Team

Once the equipment selection is made, the time has come to begin planning and scheduling the conversion of the current systems. The underlying requirement is to affix clear responsibilities, authorities and controls.

An excellent approach toward doing this is to form a conversion and installation team composed of some or all of the following people: company management, designated operator, DP manager, supervisory personnel from departments to be affected by the computer, computer vendor's representative and/or independent consultant.

Before any computer system is installed, familiarize all concerned parties — usually the entire company — with the features and capabilities of the new equipment.

As part of the computer installation, there will be a need for file conversion that will usually be performed by manually keying information from clerical records directly onto magnetic ledger cards, tape cassettes, punched cards or other storage media.

The importance of carefully performing file conversions cannot be overstated. If the file conversions are performed completely and accurately prior to installation of the computer system, the probability of a relatively trouble-free cutover to the new system will be greatly increased.

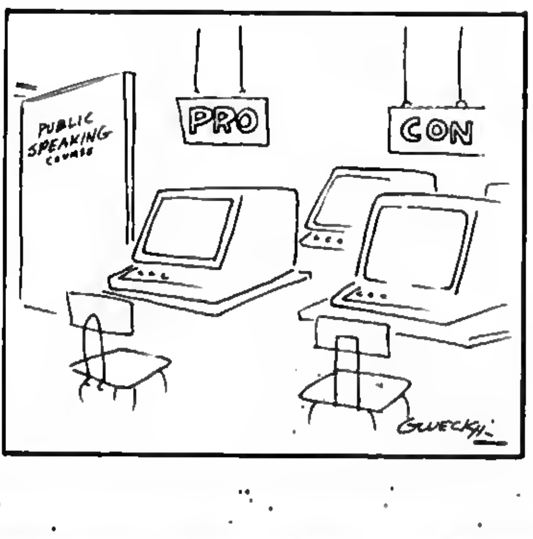
The Cutover

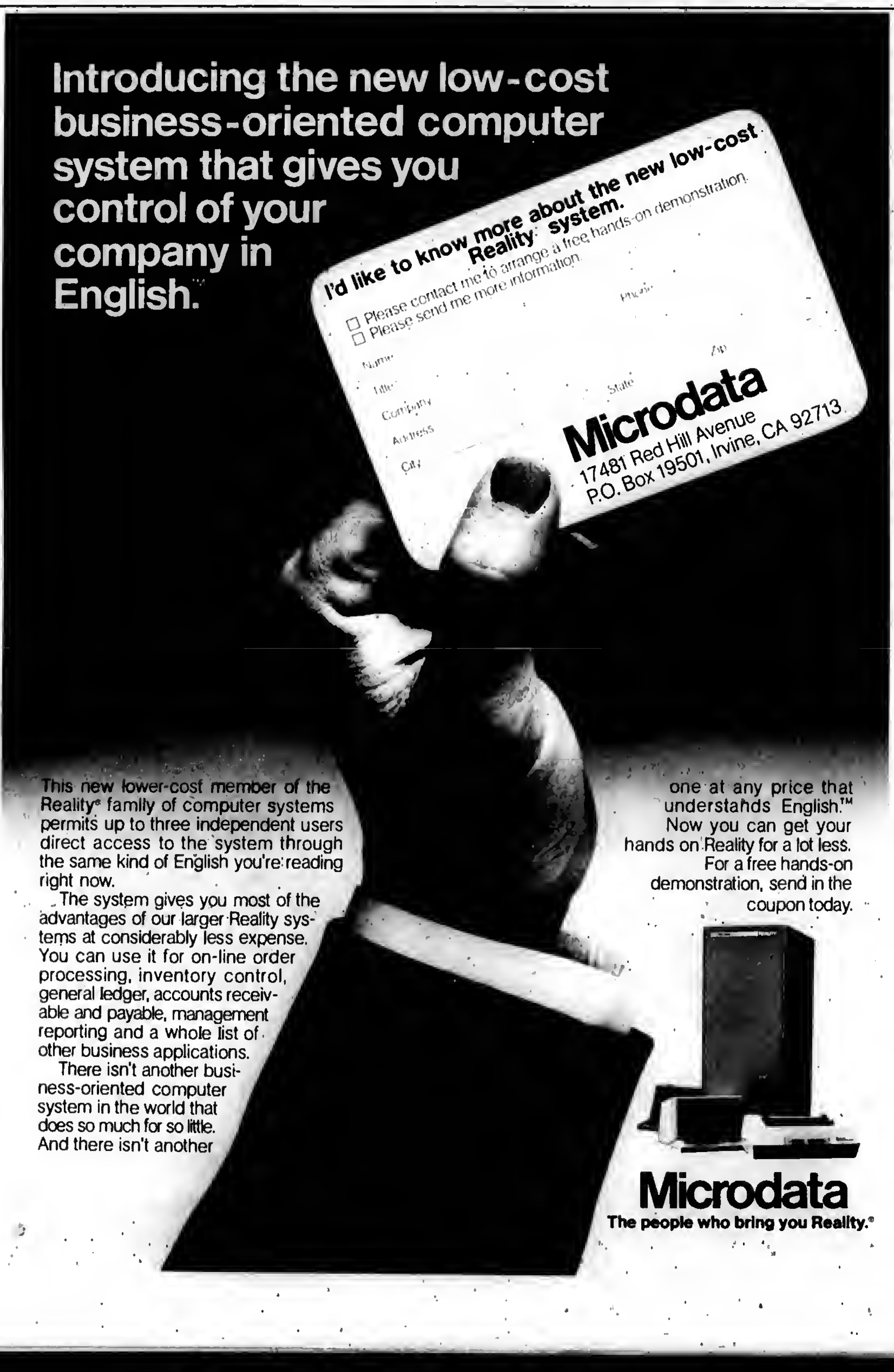
Now that the computer equipment and related hardware have been delivered and installed, it is time to begin the crucial work of cutting over. This cutover period may be not only the most critical, but also the most error-prone, frustrating and costly. For it is during the cutover that all hidden problems are forced out into the open.

Perhaps the most important guidelines in the cutover operation is this: cut over only one system function at a time. The smaller the function, the better.

A cutover technique commonly used when installing a business computer system is that of parallel operations. An alternative to parallel processing is to pick a cut-off data for each application and "go live" on the new system after that date. The programs in question must be thoroughly tested with simulated information and the only thing in question is the validity of the converted files.

Hyatt is managing editor, Datapro EDP Solutions, *Datapro Research Corp. Delran, N.J. This article is based on a report from Datapro.*

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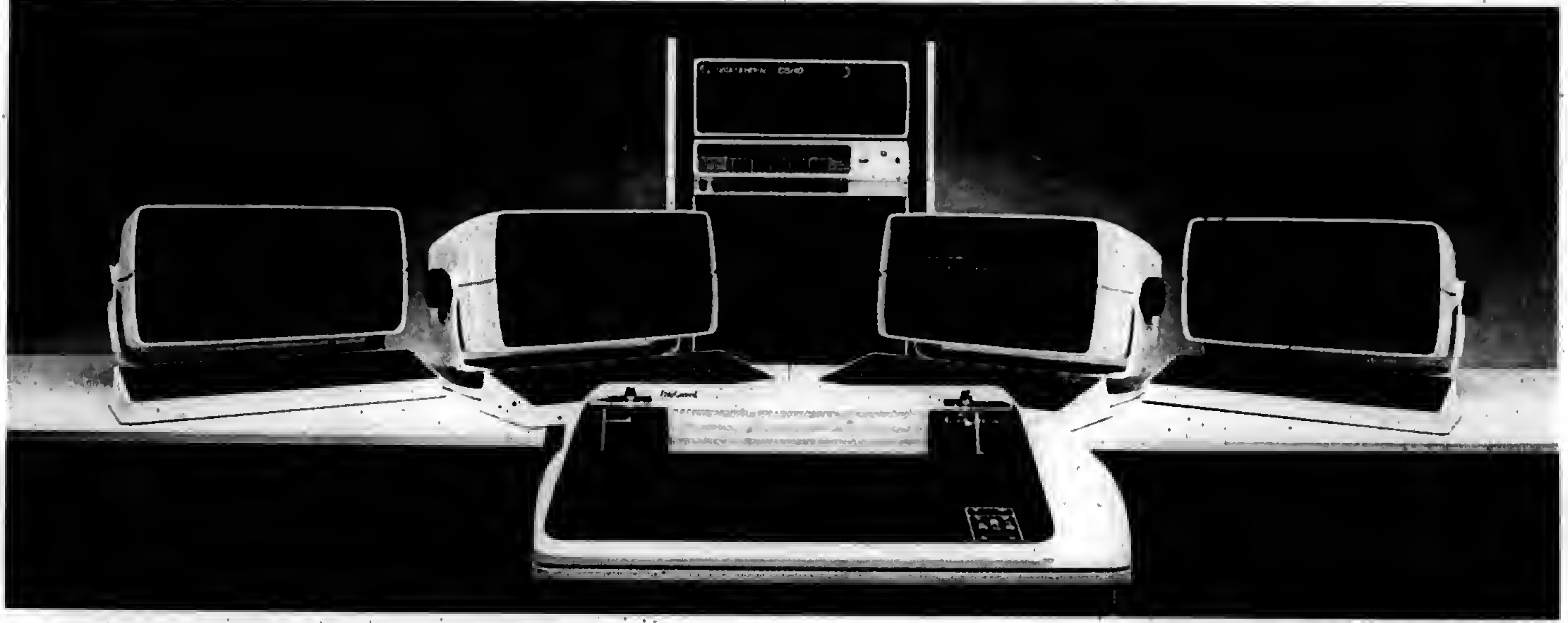

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Mini Helps Auto Parts Firm Hike Sales 400%

PLYMOUTH, Mich. — A small business system has enabled National Set Screw Corp. (NSS) here to increase its sales almost 400% in four years without adding administrative help, according to Peter Ewing, president.

Programmed by the president himself, the system performs accounting, inventory, management, order entry and job cost estimation functions. Employees in various locations can simultaneously access programs and data stored in a central system through remote workstations.

In a key application the system also figures how much money it costs per day to use a particular machine for a particular job to allow the company to find out what jobs are profitable.

In 1973 the firm, which supplies parts for the auto and construction industries, reported sales of $1.5 million. Sales rose from that figure to an excess of $6 million in the most recent fiscal year.

"We achieved this increase in our sales without adding any more administrative staff," Ewing noted. "The Datapoint 2200 system we installed in 1974, plus the additions we have made to the unit in the meantime, have enabled us to raise the productivity of existing personnel to handle the increased workload," he said.

"Our out-of-pocket savings have been tremendous," he added. "Additional people would have cost us substantially more than the Datapoint investment but would not have produced the same results. As we see it, the equipment is not just a money saver, it's a moneymaker."

Comprehensive Study

NSS began its internal computing operation with a single Datapoint 2200 system in September 1974. Before settling on the Datapoint 2200 processor, Ewing made a comprehensive study of all the small business computers available at that time.

Ewing looked at small business systems and bare-bones minis alike, including systems from Digital Equipment Corp., Burroughs Corp., Basic Four Corp., Varian Data Systems and IBM. Systems from both Microdata and Datapoint came closest to fulfilling the need; the Datapoint was chosen on price and software considerations. As Ewing pointed out, "IBM has nothing comparable to it for under $300,000."

He said no other maker offered the comprehensive operating system and sophisticated programming languages available on the 2200 "I was especially impressed by the Databus language, with which I have written almost all of the programs involved here."

Key Benefit

Another key benefit of the system, from Ewing's point of view, is economy of operation. "I absolutely did not want to add a DP manager to our staff. With the aid of the 2200, a couple of sharp secretaries and I have been able to handle the entire operation," he said.

The original 2200 installation has now been upgraded to allow several users to access the processor at one time. The Datashare system incorporates not only the 2200, but two cartridge disk drives for data and program storage, a printer and five Datapoint 3600 CRT workstations. The workstations are located in various offices at NSS.

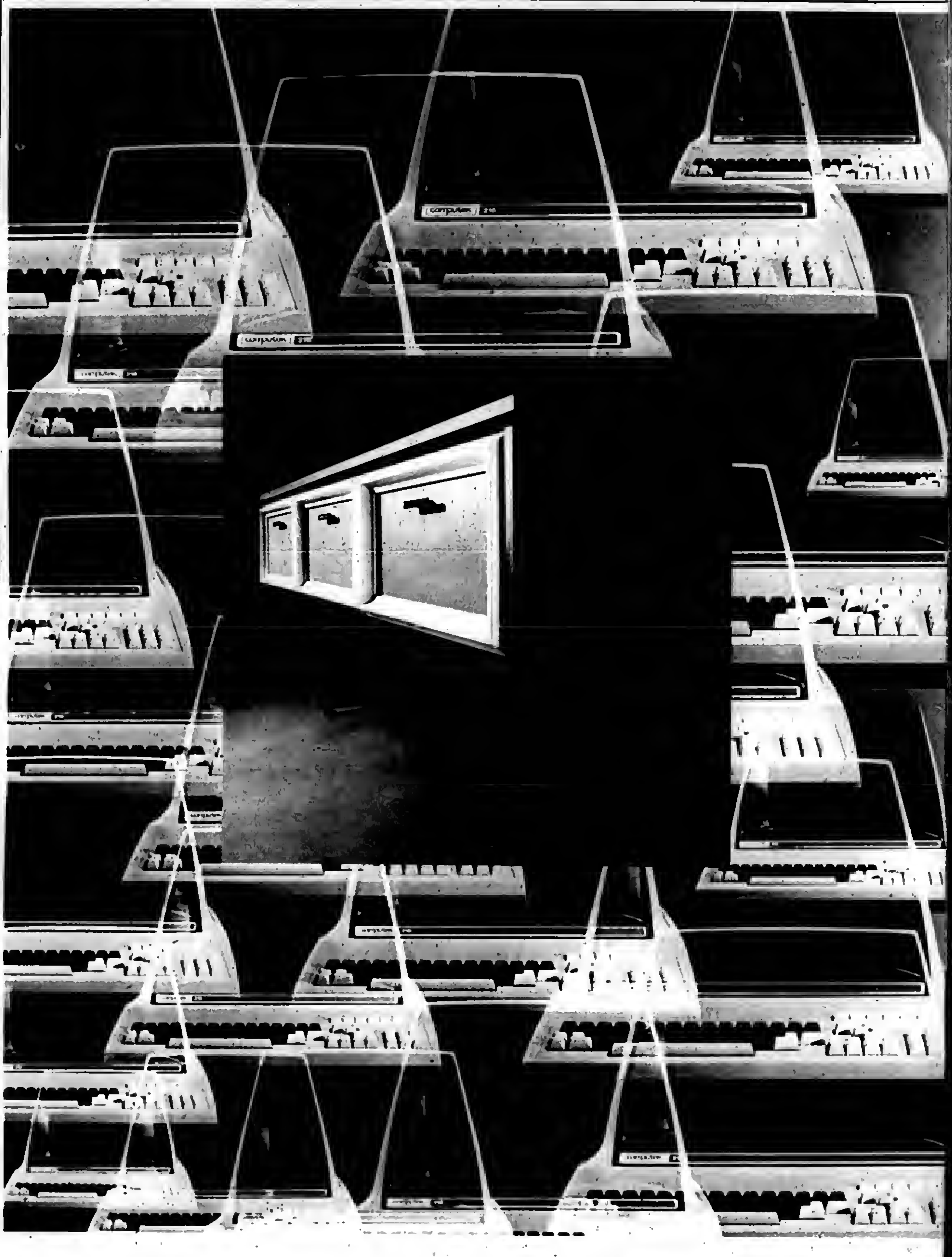
Ewing plans to increase the capability of the system again by putting in a large Datapoint 5500 processor to allow more terminals to be attached and to gain quicker response time, he said. The firm also purchased a Tektronix, Inc. 4501 graphics terminal to help its engineers, emphasizing its commitment to user-oriented DP.

Order Starts Ball Rolling

The basis for NSS' in-house activity is the purchase order, which usually arrives in the mail. The company currently receives approximately 1,000 purchases a month, all of which are entered into the system through a single unit in the company's administrative offices.

"My secretary can handle the purchase orders in a few hours each morning," Ewing stated. "Under our previous system, this amounted to a

(Continued on Page S/14)



'Powerhouse' in Small Package

Micros Helping OCR, Minis Perform Together

By Dennis Sullivan
Special to CW

In the past, the high cost of optical character recognition (OCR) has alienated that input method from the world of the minicomputer.

However, with the advent of the microprocessor, OCR has significantly dropped in price, just as the minicomputer cut costs through the use of semiconductor memory and LSI circuitry.

The end result is OCR and minis are combining their capabilities to achieve a powerhouse of performance in a small package. This provides the end user with what he is always looking for — more performance at less cost.

As the cost of hardware decreases and becomes affordable to more people, the volume of data to be processed becomes more abundant. As this data volume increases, more emphasis is being placed on distributed DP.

The large centralized computers are being replaced by the minicomputer at various DP sites. As the minicomputer begins to perform this role, OCR is waiting to demonstrate what it can do.

A minicomputer can be purchased for about $20,000, the same price range as the newer low-cost OCR systems.

The largest potential market for the minicomputer is conventional business DP. Ironically, OCR's biggest potential market is also business DP in the areas of remittance. processing or turnaround documents used in utilities, municipalities, insurance companies and publishing concerns. Other applications include banking applications such as credit card applications, reject reentry, check processing, loan payment processing and proxy scanning.

Once the minicomputer has been purchased, a significant number of CRT terminals can be added depending on the number and complexity of other functions the minicomputer will be performing. But rather than add those additional data entry terminals at a cost of about $1,000 per terminal and an overhead of 20 operators per month — which costs an additional $16,000 per month (based on $5 per hour) — and achieving a 10,000 to 11,000 keystroke rate per hour, per operator, an OCR installation costing $20,000 can reduce the labor costs while increasing the data capture rate.

'Data entry costs must come down, and they can with a mini and OCR combination.'

The user can achieve a 100,000 keystroke production level per operator and perform the work of several operators at a single workstation.

OCR Neglected

At most user sites the cost of data entry is still eating up the majority of DP costs. This is mainly because most DP managers have either neglected to give OCR an honest evaluation or have been given the wrong information on how OCR can fit into their present method of data entry. Data entry costs must come down, and they can with a mini and OCR combination.

Even if the entire document cannot be recognized by OCR (document with a preprinted account number and a location where someone will handprint the amount), OCR is still feasible by just entering the account number automatically and allowing an operator to manually enter the amount.

This method can be referred to as the "read and key" method, and aside from just reducing the manual key entry requirements, it provides a better method of handling documents. By eliminating the necessity of the operator physically handling each individual document, users can gain greater efficiency.

Sullivan is communications director at Key Tronic Corp., Spokane, Wash.

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*(Published quote of an independent computer expert. Name on request.)

32-Bit Systems May Dominate Future Mart

(Continued from Page S/2)

with getting a job done.

In similar fashion, most users never confront the PDP-11's 16-bit word, nor that of Data General's Nova or Eclipse. These systems have built up so much software support for the 16-bit word, it is of no concern except for special applications.

On the other hand, companies such as Interdata and Systems Engineering Laboratories, which have largely made their mark with 32-bit word minicomputers, have an easier time developing the system software. The 32-bit word should ultimately lead to more elegant software. Also, the longer word length with its large address space makes it possible to run large application programs without segmenting.

Because software development is easier on a longer word length machine, and software is the limiting factor now (and in the foreseeable future) for minicompter use, it seems unlikely that a new minicomputer company would develop a mini with less than a 32-bit word. This assumes all other things being equal which they never are..

Semiconductor Look-Alikes

The semiconductor manufacturers, like the minicomputer pioneers, are hardware buffs. Safaris into the wilds of software development are scary, thus they ogle any system with piles of already developed software. They also require high volume to turn a profit. So minicomputers with a large installed base and hefty software support are prime candidates for a semiconductor manufacturer's look-alike model.

This appears to point to the conclusion that the safest course for a minicomputer manufacturer is to develop little software and to maintain a small user base. That is obviously uncapitalistic and the road to failure.

What it does indicate, however, is that viable minicomputer systems cannot be produced with cookie cutters. If they are, the semiconductor houses will build a look-alike that will outsell the original because it will be cheaper. The software and hardware must be optimized for specific applications so that high-volume, general-purpose, less expensive look-alikes can't be developed to do the job.

The 32-bit word minicomputer has the inherent capacity to be applicable for a wide range of jobs because of high precision, rich instruction set, large address space and big memory. But which jobs should its hardware and software modules be optimized for? That is the manufacturer's challenge.

It seems unlikely that the 32-bit minicomputers can offer a challenge in the older 16-bit minicomputer markets: real-time industrial control, test and measurement, small time-sharing and desk calculator applications and data communications (line handling). The 16-bit word minicomputer hardware and software have been optimized for these markets. In some cases, where a 16-bit minicomputer is overqualified for the job (has more hardware and software than the job requires), the challenge will come from the microcomputer.

It is in the expanded minicomputer markets that require new software, more powerful hardware or a reorientation of the hardware/software system where the 32-bit word minicomputers shine. These are applications for larger scientific processing systems, data communications processors (front-ends, remote concentrators) and network processors in distributed processing systems.

Of course, the big market for expansion eyed by all minicomputer manufacturers is the commercial market. It is the commercial market that requires a major hardware/software reorientation.. Because of this, the commercial market is risky even though it is the most potentially lucrative market available.

The new software will be easier to program on a 32-bit mini. The systems can be expanded into very powerful configurations. The software/hardware reorientation for the commercial market, however, is probably little easier for 32-bit minicomputers than for 16-bit minicomputers.

Think Commercial

The reason is the hardware/software orientation results from the thinking of the people who plan, design, build, sell and service minicomputer systems. All these people must be reeducated to think commercial. Until that is done, precious little reorientation that is relevant to the commercial market will happen. The developer is not commercially oriented because the traditional minicomputer markets are very different from the commercial market.

Up to now, the minicomputer manufacturers have primarily responded, in interrupt mode, to the OEM market. Initially they responded to the product OEM who developed an end-user product: buying CPUs and memory from one manufacturer, peripherals from other manufacturers and tying them together with special interfaces and software. The minicomputer manufacturer was primarily concerned with making modular, high performing, low-cost CPUs and memories.

Gradually, a system OEM emerged. He wanted modular, high performing systems that included peripherals, data communications, interfaces and software. Thus, minicomputer manufacturers began to spend more and

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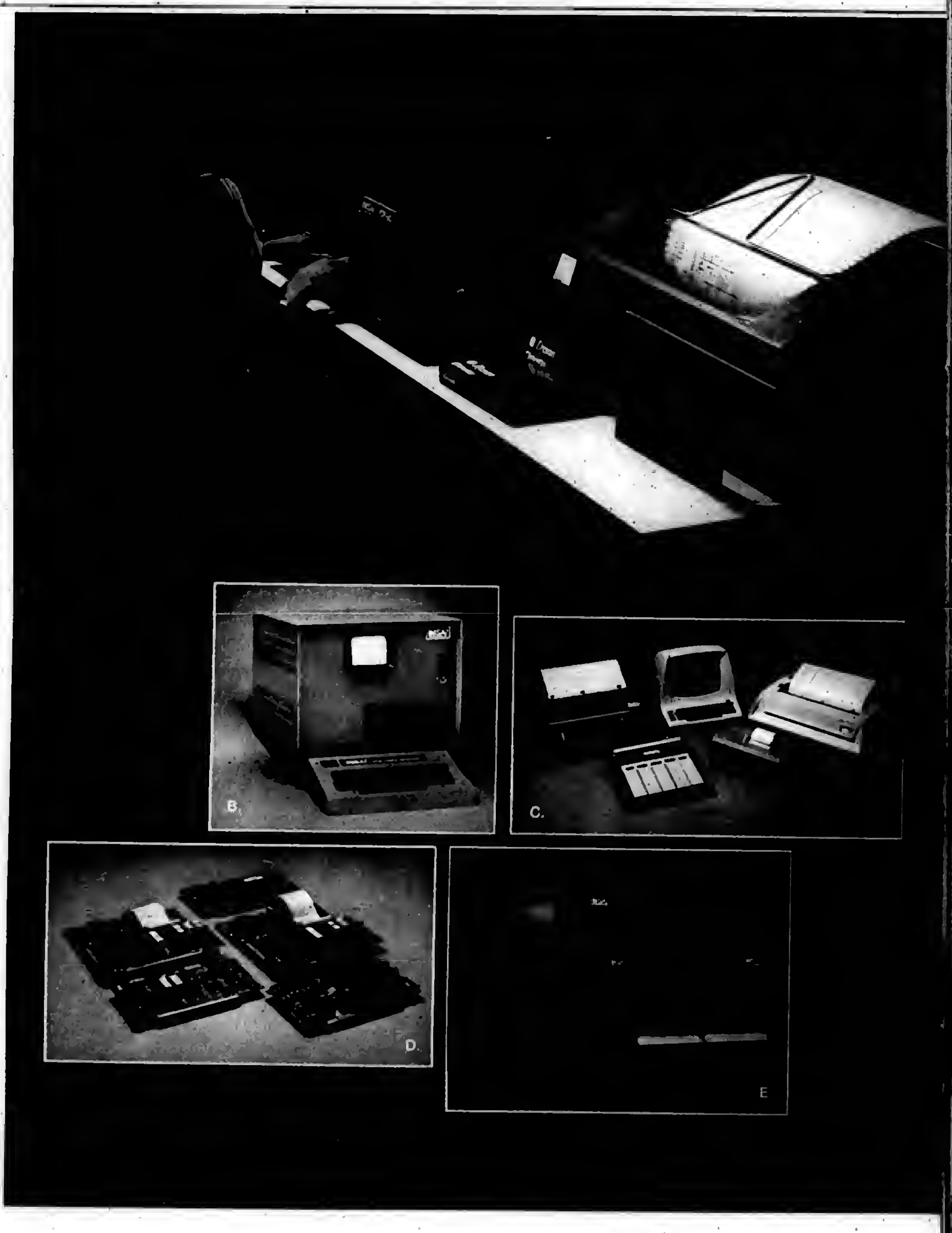

Sophisticated Capabilities

Large Mini Realistic Alternative to Mainframe

By Neal J. Rapp
Special to CW

Nearly everyone knows that minicomputers are getting smaller and cheaper. But not too many people realize they are also getting larger and cheaper. I'm referring to the growing use of the large-scale minicomputer that is, systems that provide large-scale mainframe functions in a minicomputer package.

Large-scale minicomputers are more like mainframes than minis. They are used to solve very sophisticated problems by system designers who use techniques and functions that until recently were available only on very large systems. That means the market for large-scale minicomputer systems is not a traditional minicomputer market. And that, in turn, implies that a large-scale minicomputer is much different than a traditional minicomputer.

In fact, the only reason they are called minicomputers at all is because their central processors are derived from the 16-bit architecture that has become synonomous with minicomputers.

People who use large-scale minicomputers view them as extremely cost-effective solutions to on-line, interactive problems. Their most exciting characteristic is that they combine large system software with the interactive capabilities of the traditional minicomputer, at costs far below mainframe costs.

Therefore, to get a fair indication of what large-scale minicomputers can do, and for whom they do it, they should be compared with mainframes and the mainframe environment, rather than with traditional minicomputers.

Just how do they compare to mainframes? The simplest answer is that they compare differently in different areas.

For example, there is little difference in the area of system capability. Because it has comprehensive, sophisticated software, a large-scale minicomputer system can do most things a large mainframe can do. A good large-scale minicomputer system and a mainframe have these things in common:

- A sophisticated data base management system.
- Large virtual memory addressing capabilities.
- A large main memory capacity.
- A wide array of languages and software utilities that can be mixed without restriction.
- The ability to run very large programs.
- The ability to handle a large number of users.

When it comes to performance, the differences between large-scale minicomputers and mainframes become a matter of interpretation.

If performance is measured in interactive, on-line terms – response time, for example – the large-scale minicomputer and mainframe are very close, with the advantage usually going to the minicomputer. But when performance is measured in batch-oriented terms, the mainframe, which was designed for batch work, ordinarily comes out on top.

There is a significant physical difference between large-scale minicomputers and mainframes. Obviously, the minicomputer-based system is considerably smaller. While size alone may not be an important criterion, the mainframe's size often means a user must provide expensive environmental controls that are not always necessary with a large-scale minicomputer.

Finally, there's the difference in cost. Because their orientation has primarily been toward interactive, on-line work, large-scale minicomputers offer significantly more interactive work per dollar compared with mainframes. On a system level, it's safe to say that a large-scale minicomputer system costs about one-tenth to one-half the price of a mainframe with comparable capabilities.

Since system designers have the same tools available on mainframes and large-scale minicomputers – comprehensive software capabilities, large virtual memory address space and large amounts of storage – it follows that mainframes and large-scale minicomputers can be used for similar applications.

Specifically then, who uses large-scale minicomputers and how are they used?

One class of user is the one with a number of remote sites, each using most of the data it generates. The large-scale minicomputer's data base management capability supports local operations, and its efficient data communication capability allows data to be transmitted to a host system.

For example, a West Coast aerospace/electronics company uses a large-scale mini system in the headquarter's financial department. The system lets the vice-president of finance gather data from a division's operating groups and use the data to prepare monthly financial reports. Specific information can be transmitted to a corporate host system, an IBM 370/158, to update its files.

Another class of user is the one who

(Continued on Page S/16)

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Auto Parts Company's Mini Helps Boost Sales

(Continued from Page S/10)

full-time job for at least one clerk and other less qualified help."

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cros Helping OCR, Minis Perform Together

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with the advent of
ocessor, OCR has
v dropped in price,
minicomputer cut
ugh the use of semiconductor memory and LSI circuitry.

The end result is OCR and minis are combining their capabilities to achieve a powerhouse of performance in a small package. This provides the end user with what he is always looking for — more performance at less cost.

As the cost of hardware decreases and becomes affordable to more people, the volume of data to be processed becomes more abundant. As this data volume increases, more emphasis is being placed on distributed DP.

The large centralized computers are being replaced by the minicomputer at various DP sites. As the minicomputer begins to perform this role, OCR is waiting to demonstrate what it can do.

A minicomputer can be purchased for about $20,000, the same price range as the newer low-cost OCR systems.

The largest potential market for the minicomputer is conventional business DP. Ironically, OCR's biggest potential market is also business DP in the areas of remittance processing or turnaround documents used in utilities, municipalities, insurance companies and publishing concerns. Other applications include banking applications such as credit card applications, reject reentry, check processing, loan payment processing and proxy scanning.

Once the minicomputer has been purchased, a significant number of CRT terminals can be added depending on the number and complexity of other functions the minicomputer will be performing. But rather than add those additional data entry terminals at a cost of about $1,000 per terminal and an overhead of 20 operators per month — which costs an additional $16,000 per month (based on $5 per hour) — and achieving a 10,000 to 11,000 keystroke rate per hour, per operator, an OCR installation costing $20,000 can reduce the labor costs while increasing the data capture rate.

The user can achieve a 100,000 keystroke production level per operator and perform the work of several operators at a single workstation.

> *'Data entry costs must come down, and they can with a mini and OCR combination.'*

OCR Neglected

At most user sites the cost of data entry is still eating up the majority of DP costs. This is mainly because most DP managers have either neglected to give OCR an honest evaluation or have been given the wrong information on how OCR can fit into their present method of data entry. Data entry costs must come down, and they can with a mini and OCR combination.

Even if the entire document cannot be recognized by OCR (document with a preprinted account number and a location where someone will handprint the amount), OCR is still feasible by just entering the account number automatically and allowing an operator to manually enter the amount.

This method can be referred to as the "read and key" method, and aside from just reducing the manual key entry requirements, it provides a better method of handling documents. By eliminating the necessity of the operator physically handling each individual document, users can gain greater efficiency.

Sullivan is communications director at Key Tronic Corp., Spokane, Wash.

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*(Published quote of an independent computer expert. Name on request.)

32-Bit Systems May Dominate Future Mart

(Continued from Page S/2)

with getting a job done.

In similar fashion, most users never confront the PDP-11's 16-bit word, nor that of Data General's Nova or Eclipse. These systems have built up so much software support for the 16-bit word, it is of no concern except for special applications.

On the other hand, companies such as Interdata and Systems Engineering Laboratories, which have largely made their mark with 32-bit word minicomputers, have an easier time developing the system software. The 32-bit word should ultimately lead to more elegant software. Also, the longer word length with its large address space makes it possible to run large application programs without segmenting.

Because software development is easier on a longer word length machine, and software is the limiting factor now (and in the foreseeable future) for minicompter use, it seems unlikely that a new minicomputer company would develop a mini with less than a 32-bit word. This assumes all other things being equal which they never are.

Semiconductor Look-Alikes

The semiconductor manufacturers, like the minicomputer pioneers, are hardware buffs. Safaris into the wilds of software development are scary, thus they ogle any system with piles of already developed software. They also require high volume to turn a profit. So minicomputers with a large installed base and hefty software support are prime candidates for a semiconductor manufacturer's look-alike model.

This appears to point to the conclusion that the safest course for a minicomputer manufacturer is to develop little software and to maintain a small user base. That is obviously uncapitalistic and the road to failure.

What it does indicate, however, is that viable minicomputer systems cannot be produced with cookie cutters. If they are, the semiconductor houses will build a look-alike that will outsell the original because it will be cheaper. The software and hardware must be optimized for specific applications so that high-volume, general-purpose, less expensive look-alikes can't be developed to do the job.

The 32-bit word minicomputer has the inherent capacity to be applicable for a wide range of jobs because of high precision, rich instruction set, large address space and big memory. But which jobs should its hardware and software modules be optimized for? That is the manufacturer's challenge.

It seems unlikely that the 32-bit minicomputers can offer a challenge in the older 16-bit minicomputer markets: real-time industrial control, test and measurement, small time-sharing and desk calculator applications and data communications (line handling). The 16-bit word minicomputer hardware and software have been optimized for these markets. In some cases, where a 16-bit minicomputer is overqualified for the job (has more hardware and software than the job requires), the challenge will come from the microcomputer.

It is in the expanded minicomputer markets that require new software, more powerful hardware or a reorientation of the hardware/software system where the 32-bit word minicomputers shine. These are applications for larger scientific processing systems, data communications processors (front-ends, remote concentrators) and network processors in distributed processing systems.

Of course, the big market for expansion eyed by all minicomputer manufacturers is the commercial market. It is the commercial market that requires a major hardware/software reorientation. Because of this, the commercial market is risky even though it is the most potentially lucrative market available.

The new software will be easier to program on a 32-bit mini. The systems can be expanded into very powerful configurations. The software/hardware reorientation for the commercial market, however, is probably little easier for 32-bit minicomputers than for 16-bit minicomputers.

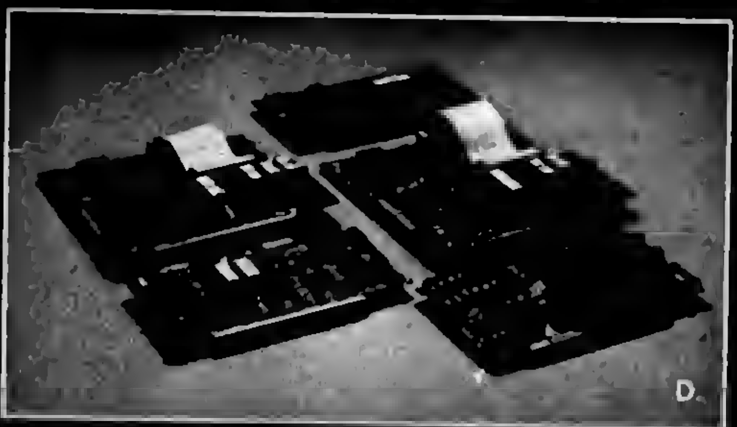
Think Commercial

The reason is the hardware/software orientation results from the thinking of the people who plan, design, build, sell and service minicomputer systems. All these people must be reeducated to think commercial. Until that is done, precious little reorientation that is relevant to the commercial market will happen. The developer is not commercially oriented because the traditional minicomputer markets are very different from the commercial market.

Up to now, the minicomputer manufacturers have primarily responded, in interrupt mode, to the OEM market. Initially they responded to the product OEM who developed an end-user product: buying CPUs and memory from one manufacturer, peripherals from other manufacturers and tying them together with special interfaces and software. The minicomputer manufacturer was primarily concerned with making modular, high performing, low-cost CPUs and memories.

Gradually, a system OEM emerged. He wanted modular, high performing systems that included peripherals, data communications, interfaces and software. Thus, minicomputer manufacturers began to spend more and

(Continued on Page S/22)



Sophisticated Capabilities

Large Mini Realistic Alternative to Mainframe

By Neal J. Rapp
Special to CW

Nearly everyone knows that minicomputers are getting smaller and cheaper. But not too many people realize they are also getting larger and cheaper. I'm referring to the growing use of the large-scale minicomputer that is, systems that provide large-scale mainframe functions in a minicomputer package.

Large-scale minicomputers are more like mainframes than minis. They are used to solve very sophisticated problems by system designers who use techniques and functions that until recently were available only on very large systems. That means the market for large-scale minicomputer systems is not a traditional minicomputer market. And that, in turn, implies that a large-scale minicomputer is much different than a traditional minicomputer.

In fact, the only reason they are called minicomputers at all is because their central processors are derived from the 16-bit architecture that has become synonomous with minicomputers.

People who use large-scale minicomputers view them as extremely cost-effective solutions to on-line, interactive problems. Their most exciting characteristic is that they combine large system software with the interactive capabilities of the traditional minicomputer, at costs far below mainframe costs.

Therefore, to get a fair indication of what large-scale minicomputers can do, and for whom they do it, they should be compared with mainframes and the mainframe environment, rather than with traditional minicomputers.

Just how do they compare to mainframes? The simplest answer is that they compare differently in different areas.

For example, there is little difference in the area of system capability. Because it has comprehensive, sophisticated software, a large-scale minicomputer system can do most things a large mainframe can do. A good large-scale minicomputer system and a mainframe have these things in common:

- A sophisticated data base management system.
- Large virtual memory addressing capabilities.
- A large main memory capacity.
- A wide array of languages and software utilities that can be mixed without restriction.
- The ability to run very large programs.
- The ability to handle a large number of users.

When it comes to performance, the differences between large-scale minicomputers and mainframes become a matter of interpretation.

If performance is measured in interactive, on-line terms — response time, for example — the large-scale minicomputer and mainframe are very close, with the advantage usually going to the minicomputer. But when performance is measured in batch-oriented terms, the mainframe, which was designed for batch work, ordinarily comes out on top.

There is a significant physical difference between large-scale minicomputers and mainframes. Obviously, the minicomputer-based system is considerably smaller. While size alone may not be an important criterion, the mainframe's size often means a user must provide expensive environmental controls that are not always necessary with a large-scale minicomputer.

Finally, there's the difference in cost. Because their orientation has primarily been toward interactive, on-line work, large-scale minicomputers offer significantly more interactive work per dollar compared with mainframes. On a system level, it's safe to say that a large-scale minicomputer system costs about one-tenth to one-half the price of a mainframe with comparable capabilities.

Since system designers have the same tools available on mainframes and large-scale minicomputers — comprehensive software capabilities, large virtual memory address space and large amounts of storage — it follows that mainframes and large-scale minicomputers can be used for similar applications.

Specifically then, who uses large-scale minicomputers and how are they used?

One class of user is the one with a number of remote sites, each using most of the data it generates. The large-scale minicomputer's data base management capability supports local operations, and its efficient data communication capability allows data to be transmitted to a host system.

For example, a West Coast aerospace/electronics company uses a large-scale mini system in the headquarter's financial department. The system lets the vice-president of finance gather data from a division's operating groups and use the data to prepare monthly financial reports. Specific information can be transmitted to a corporate host system, an IBM 370/158, to update its files.

Another class of user is the one who

(Continued on Page S/16)

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- Multiple I/O—2 cassette, 2 parallel, 1 serial & 1 control I/O.
- DMA—For floppies & line printers.

Peripherals:
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System component options include single or dual mini and standard floppy disks. The choice is yours, configure the system as you like.

IMSAI has answers for the educator, too. Take the basic PCS-80, add 8K of PROM, 4K of RAM and our self-contained 8K BASIC software, and you have a complete operating system your entire department can use to teach anything from elementary programming to advanced computer science.

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Features and specifications subject to change without notice.

Auto Parts Company's Mini Helps Boost Sales

(Continued from Page S/10)

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Tracks Order Progress

Photo Studio's Mini Puts Production In Focus

CHATTANOOGA, Tenn. — To say that Olan Mills School Portrait Division is using a minicomputer to solve a production problem doesn't really focus in on the extent of that problem.

Each year the firm photographs and processes portraits for over 1 million elementary, high school and college students from several hundred schools located in thirteen Southeastern states.

Making sure that Joan Doe's picture gets to Joan Doe can be a monumental task, according to Olan Mills II, chairman of the board.

The minicomputer is part of a larger system designed by Technical Analysis Corp. (TAC) of Atlanta. The entire system is a combination of a Data General Corp. Eclipse minicomputer and several Micronova systems. The Micronovas are replacing Monroe calculators previously used in the production process, according to Fred Friday, production control manager.

When an order is received its requirements are input to the system via one of six interactive display terminals. The system then monitors the movement of the order through the complete photographic and packaging process.

The minicomputer tracks the location of each order in process, schedules work loads and alerts staff members to potential production problems before they become serious.

Should delays occur, it informs staff personnel so that the delayed order can be located and placed in a top priority production flow, Mills said.

In addition to order tracking, production scheduling and accounting, the system is used for software development and to load compiled programs into microcomputers that control the color printing machines used for printing the photographs.

Long-term color information is stored and analyzed periodically to fine tune the total system. Technicians also monitor the photographic processes on a daily basis, making any necessary changes to insure color quality, he added.

The configuration consists of the CPU, a 92M-byte disk system, dual 9-track magnetic tape transports, six interactive CRTs, two hand-held OCR readers, two medium-speed printers and a line printer. The system runs under Business Basic software, supplied by TAC.

Ended Manual Functions

Prior to purchasing the large-scale mini, the firm used a Data General Nova 2 to develop software and load compiled programs into the microcomputers. Accounting functions at that time were performed manually and no computerized tracking system existed. The Nova 2 is now located at another facility where it is used for photographic and electronic research, Mills said.

When switching from the Nova 2 to the Eclipse the company did not consider any other manufacturer's system, Friday said, because the Nova 2 was running the TAC Basic and "it would have been a massive effort to change over." Besides, the company was satisfied with the system, he indicated.

"The main considerations for purchasing the Eclipse," Mills said "were speed, expandability and, of course, cost benefits. We needed a machine powerful enough to handle the eight ports that we required at that time and would be expandable to accommodate future growth."

He said the company included the 3330-type 92M-byte disk subsytsem to allow the high-speed system to be easily expanded with up to three additional 92M-byte disk drives. The cost benefits resulted from decreased production costs. "The improvement in service further justified our computer investments," he added.

"The Business Basic language that we have been using since we installed the Data General system offers many features that we find particularly useful. One of the most significant is the multiterminal/multiprogramming capability inherent to most Basic systems," he noted.

"To us, however, the most attractive feature of the language is the indexed sequential access method. It allows rapid inquiry from a reasonably large, randomly organized data base. Furthermore, its file positioning feature permits any byte within a file to be accessed without the need to define a specified record length. This allows variable-length records to be located within a single file, Mills stated.

According to Friday, "many of the RDOS utility features incorporated within Business Basic are also useful to us, since they allow system maintenance concurrent with operation under Basic. One of the most significant utilities is a comprehensive file maintenance system which allows inspection and/or updating of many of the RDOS-type files within our system."

System Saves Farm $650/Month

By Cliff Burke
Special to CW

VINCENT, Iowa — Trying to communicate ideas and solutions through systems people and programmers to a computer was a difficult but necessary task until my firm, New Cooperative, Inc. here, got its portable small business system.

When IBM came out with the 5100 portable system about a year and a half ago, I was convinced this was my opportunity to learn the Basic language and write programs to get the results I wanted.

New Cooperative is a farm cooperative located in a small town here. The business is larger than an average sized company and sales this year will be about $36 million.

Cooperatives face a unique accounting problem. All transactions of the member/owners have to be maintained so that dividends can be distributed based on their patronage.

After receiving the 5100 it took seven months to write and debug the necessary programs. Presently we are running 65 programs on the system, 17 of which pertain to the patronage and members' equity problem. We can write payroll checks to 50 employees in one hour and mail 1,300 monthly statements to patrons on the second work day of the month.

Customer statements are itemized in the language familiar to the customer so, for example, corn sales to the company is Corn Purchases to the customer.

The system also provides management with departmental preliminary profit and loss and balance sheets on the second work day of a month. The general ledger trial balance is also run on the first work day of each month.

Sales analysis and budget creation are two more key applications for the unit. In the budget applications the company uses the portable system in the conference room to directly input the departmental budgets and then print out results. Revisions made to the budgets during the year are easily incorporated.

Accounts receivable aging can be listed any time during the month. In addition, the system computes and writes checks to the member/owners showing a detailed history of their equity holdings in the cooperative. It also provides listings of warehouse receipts held by the customer either in alphabetical order or by number. Checks can be sorted on the system and listed in numerical order for easier bank reconciliation.

All of these applications plus the convenience of a computer that is simple enough for me and my three employees to operate has made me realize there are advantages to in-house computing. I learned how to program from the manuals that came with the computer.

The cost of the system was also very attractive. The basic system cost about $25,000. The software was written in-house. The maintenance agreement is $110/mo. Paper cost is about $25/mo. Total monthly cost, not including investment credit, using straight line five-year depreciation is $555.

The cost of the previous system, which was a CRT connected to a service center 500 miles away, was between $1,100- and $1,300/mo.

This is a savings of $650/mo, with no increase in personnel. The best thing is now we have a "feel" for the accounting we do because we do it all in-house.

Burke is an accountant with New Cooperative.

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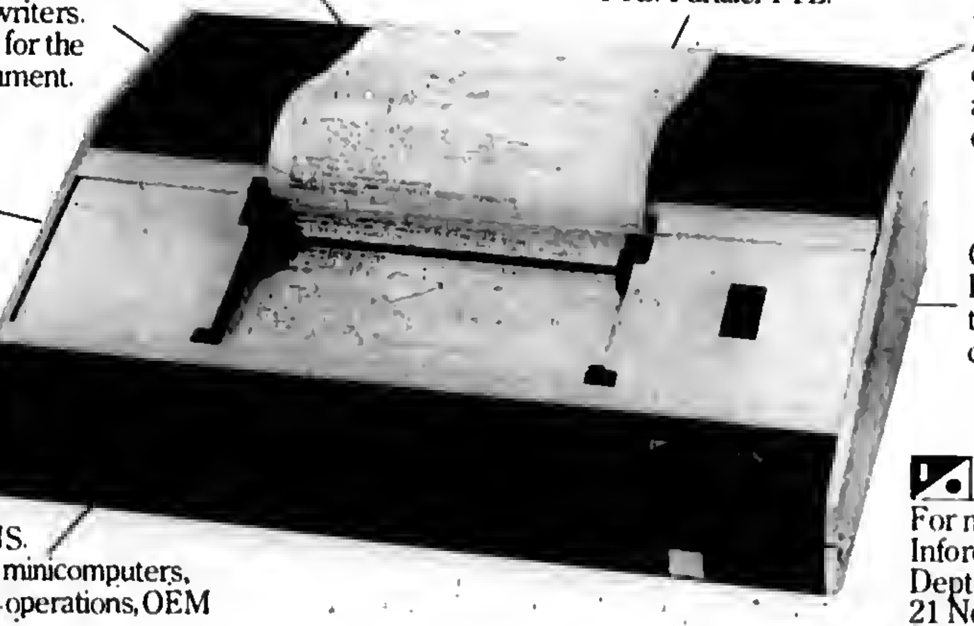

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Foreign Office Arrives at Mini, T/S Balance

(Continued from Page S/3)

Mark III services.

In our plants we installed Datapoint 2200 minicomputers with 5M-byte disk and 300 line/min printers to do order entry, invoicing, stock status and in-plant reporting. All applications were designed to be usable in all countries and screen formats can be compiled in different languages for different countries. The minis periodically transmit sales, production and other data to the Mark III service.

At our accounting/administrative offices the minis and the time-sharing service more equally share the functions as they interact to provide a total system. The minis are used by accountants to enter monthly accounting data. All editing is done interactively, contra accounts are automatically generated where possible, updates are made to exchange rates (all transaction data is entered in local currency) and maintenance to master files is performed.

When a transmission to Mark III is requested by the accountant (a logical function request, all control characters are supplied) all files are prefixed with the JCL or control data necessary to trigger the correct programs in delayed batch on Mark III. If any file maintenance was performed on the mini, this is now performed on the corresponding files at the time-sharing service.

All data or requests for processing sent from the minis in accounting offices are prefixed by Fips codes (nation identifiers) under program control. Therefore, all transactions are identified by country. This allows each accounting office to add or delete combinations of master data (account records, account/responsibility relationships, distribution algorithms without affecting other accounting offices in other countries.

Requests for reports such as a preliminary trial balance are also prefixed under program control. This allows the Cobol programs on Mark III to process only the data for that requestor, using only the proper portion of the master files and selecting those report headings corresponding to the requestor's language.

This gives all users the feeling that the system is fully under their control. Each user works under his own schedule without waiting until all users are ready to perform a given step, although they all share common time-sharing programs and files.

This combination of resources on our accounting system allows us to provide interactive processing to our accounting staff with minis, while having the resource of a large processor available when needed, particularly the first several work days of each month.

The monthly management reports are available to all users in Europe, and each user receives his selection of reports in the local language upon request. An added advantage of using the time-sharing service as the central processor is that it allows corporate headquarters in the U.S. access to data for consolidation and access to reports generated.

We also have the potential to add other overseas subsidiaries such as Mexico, South America and the Far East to our accounting systems as they all share the same chart of accounts, and the minicomputer programs can add their language screens to the library to facilitate processing in the local language.

Harper is manager, corporate planning at Johns-Manville Corp., Denver, Colo.

Minis Tackling Mainframe Jobs

(Continued from Page S/13)

adds a new interactive application to a batch-oriented mainframe system. In many cases, the cost of upgrading the system and converting the software is greater than the cost of the large-scale minicomputer system.

A federal government agency wanted to experiment with providing on-line terminal support for 50 to 75 users. To do this, it installed a supermini as a front-end processor to its existing mainframe systems. The mini system handles communications and shares the large number-crunching load with the mainframe systems.

A third type is the cost-controlled user, who has a job that calls for mainframe capability, but who does not want to commit capital to a very expensive computer.

An example is a New York City institutional investment management firm that replaced a small, outdated system with a large minicomputer. It now runs over 200 programs for securities research and analysis.

No list of large-scale minicomputer users can span the entire range of computer users. That's because large-scale mini systems are not the answer to every problem. Mainframes will, for example, probably be the best solution for the jobs they were designed for: the high-volume batch application.

But the user who must run programs that are typically 3 million bytes long, maintain data bases that run 1 billion or 2 billion bytes or support multiple simultaneous interactive users in several languages should certainly look at the large-scale

Rapp is program manager for interactive data processing at Prime Computer, Inc., Framingham, Mass.

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Inventory System a Lifesaver for Marine Firm

RICHMOND, Va. — Tired of "borrowing" time on an IBM 3/10 from a friend on nights and weekends, Jeremy Crews, president of Marine Development Corp. here, decided to go inhouse with a GRI-99 minicomputer.

"I got started on the IBM 3/10 about four years ago," Crews explained, "when we got into a real bind. Our annual sales were $2 million and we found ourselves with $1 million in parts inventory," he said.

"We couldn't get our billings out fast enough and we couldn't ship because we couldn't get parts," the manufacturer of boat air conditioning systems noted.

"Purchasing couldn't get parts because we hadn't paid our supplier's bills; accounting couldn't pay the bills because we had borrowed to the extent of our credit line to pay for our $1 million worth of parts on hand."

Crews began to design a manual parts forecast system. After it took three people four hours to develop a usage forecast for the first of 3,500 detail parts for the company's 600 products, he decided to seek an automated solution to the inventory trouble.

To try to bring the situation under control, Crews "borrowed" time on an IBM 3/10 from a friend and learned how to program the system himself. His friend didn't want just anybody from the company using the system, he explained, so he did all the work.

The effort was successful, he reported. For the first time the company knew the number of products each detail part was used to build, the number of parts on hand and how many parts should be purchased on what date to meet the production schedule.

The effort was successful. For the first time, the company knew the number of products each detail part was used to build, the number of parts on hand and how many parts should be purchased to meet the production schedule.

Tiring Schedule

"I got tired of nights and weekends" and decided to look for an in-house system, Crews said. The company examined several systems including the 3/10, which it dismissed as too expensive; the IBM 32, Burroughs B700, systems from NCR; Basic Four; and Logical Machines Corp.'s Adam system. He chose the GRI-99 because it came closest to having the flexibility and capability of the IBM 3/10 at "the right kind of price."

Another reason the company switched to the GRI machine is that it is cardless and "we didn't want to fool with cards anymore." Input on the GRI system is via CRT terminals, he noted.

The firm purchased the GRI-99 about a year ago from Automated Data Systems, the local GRI distributor, which also provides service for the system. Crews described the service as good.

System Configuration

The configuration includes a 24-byte CPU, disk drive, two CRT terminals and a 100 line/min printer. To expand the current system, the firm has ordered a third CRT terminal, a second printer and an additional 8K bytes of main memory.

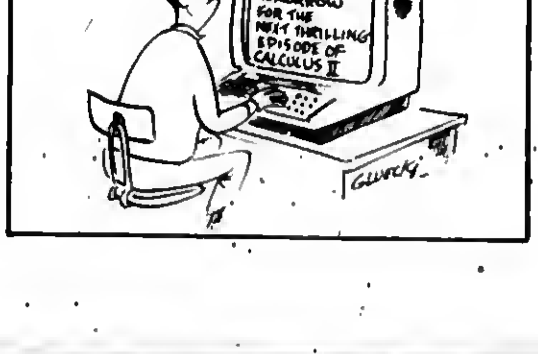
Conversion to the system was straightforward; card files were transferred to disk storage. Because the local GRI distributor owns a duplicate model of the computer, the company was able to begin conversion even before its system 99 was delivered.

The firm's system now handles payroll, shipping orders, invoices, accounts payable, accounts receivable, vendor files, dealer files, cross-reference information, back orders and an overseas subsidiary's records, in addition to materials control.

"Our sales are twice what they were four years ago, but our inventory is down from $1 million to $400,000. Now we only stock the parts we need and we ship finished products on time," Crews said.

"I really appreciate the flexibility of this machine. We can set up files and reports just about any way we want. We can change programs and recompile right on the machine in just a few minutes. We can even set up a series of reports to run on an or/if basis so that the computer can decide which program should be run next without anyone being there to tell it. There are all kinds of things we can do," he said.

"I'm really convinced it's the best machine I could get for the money," Crews stated.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Extensive Analysis Leads Firm to Mini Choice

(Continued from Page S/3)

last year," Bevis said, and dealt with the financial aspects, business aspects and two categories of technical requirements — those dealing with remote to host communications and those dealing with local processing.

At this stage, the company wanted a system that could do data entry in the foreground mode using from two to six terminals. "For local pocessing we wanted to have a high-level language facility and be able to run multiple applications. The on-line interactive access to the host today would consist of a dial-up 2,400 bit/sec bisynchronous IBM protocol. Tomorrow, we envision a multidropped lease line network using system network architecture (SNA)/synchronous data link control with detail," he noted.

To avoid repetitive questions after the RFP was issued, the firm set up a vendors' conference about two weeks later. At that time they requested the vendors follow the format specifically, both in exact section-heading and item number, so the firm could review the answers more easily, Bevis said.

The firm looked at the vendor's maintenance capabilities, vendor's stability, installed equipment base, flexibility and future direction. For hardware it. examined the general-purpose mini capabilities, multitasking, ease of program development, CPU architecture and the screen management and file structure used. "The technical requirement was primarily a statement on SNA development, Bevis said.

All the requirements were defined by quartile and the highest score any vendor could get was 40.

"We narrowed our group of 11 respondents down to six finalists (IBM, Four-Phase, Digital Equipment Corp., Microdata Corp., Datapoint, CA). From a paper standpoint, looking at the proposals and looking at all those points and adding them up . . . probably CA was near the bottom of the six finalists at that point in time," he noted.

Because the company wanted to "separate fact from fiction in their proposals," the firm decided to go through a benchmark evaluation.

"We would ask them to come in and install a system at Fireman's Fund for two or three weeks." This gave the company an opportunity to really ascertain the hardware performance, software capabilities, throughput and vendor responsiveness, he said.

"We had some really interesting results from the benchmarks," Bevis noted. "It really promoted a high intensity of competition. We had people knocking on our doors all over the place and calling everybody wondering what was going on. Some vendors were anxious to get their systems in benchmark and others were not too happy about that at all, because the equipment they proposed was not ready for us to benchmark.

Difficulties arose in comparing identical systems because some manufacturers did not have the highest end of the disk range, he stated. Another problem was the way some of the screens were used. Some of the systems had the screen formats within the system while in others the formats stored within the screen itself.

While the systems were installed the company ran several benchmarks. One to determine data entry performance measured the number of 50-character data records entered by six terminals in one minute.

Another benchmark measured file look-up. The insurance company generated a dummy file, measuring the number of screen images read from the largest file by six terminals in one minute. The CA system excelled in this one, Bevis said.

In still another benchmark the firm ran data entry, a disk file look-up printer spooler and measured the throughput of each of them running concurrently. The CA system also performed better than the others on this one, he said.

Because the company was concerned that no sooner would the systems be installed in the branches than the remote site would develop requirements heretofore unknown, it did an analysis of the cost of going from a small configuration to a larger configuration for each vendor.

"Finally we came up with an overall grid divided into four major categories: technical, financial, business and communications," he noted.

The selection was made on equipment the vendors had now, not any under development because, Bevis noted, the firm had been promised developments several times that never came to be.

The firm finally selected CA but was very concerned about the maintenance area, which was third-party maintenence. "The company was told it would have to come up with some rather creative and innovative solutions to compensate for what we thought then was a deficiency," he said.

CA agreed to put in four regional centers to sevice the 29 branches in addition to third-party Sorbus maintenance which is used in four cities.

The vendor also agreed to put in a network control center that has a Wats line for on-line diagnostics to the various branch offices staffed by CA personnel.

Company stability was also a factor. "We spent a lot of time with their people looking at their financial position and our financial people were very impressed," Bevis noted.

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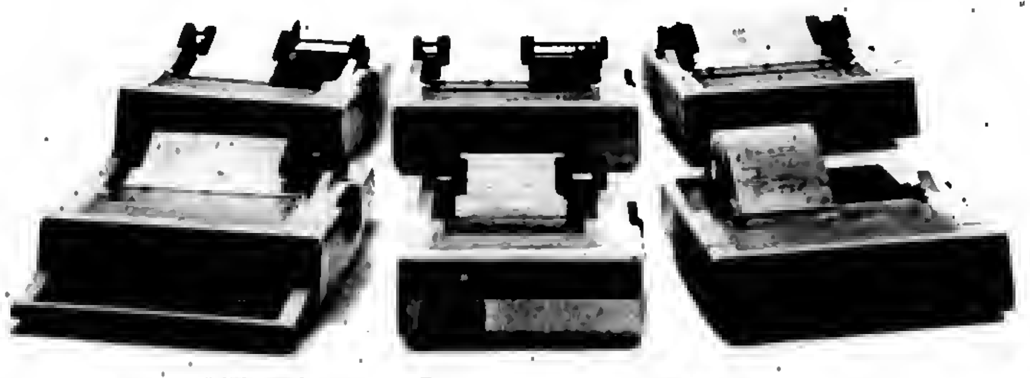

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Firm Selects Mini System For Control, Expandability

SAN JOSE, Calif. — The "typical situation in which the user doesn't know anything about computers" and trusts his applications to an outside service has been replaced at Employee Benefits Insurance Co. here with an in-house minicomputer that is firmly under the control of the user, according to Dana Brown, the firm's administrator of information services.

The company switched from the service to in-house programming after the programmers who were working on applications for EBI left the service company, Brown explained. What resulted was an in-house system destined to give the company more control over its applications.

Choosing the correct in-house system was an extensive affair, Brown said. The company looked at the IBM System 3, Hewlett-Packard 3000 Series II Digital Equipment Corp. PDP-11/70 under RSTS, the Prime Computer, Inc. 400, Data General Corp. Eclipse and Microdata Corp. Reality.

"We looked very hard at the Digital Equipment system" because Brown came from a DEC environment, but the software couldn't be justified. The Data General Eclipse was just beginning a data base management capability and the Prime system was "too young," he said. "We needed a system to run and be supported," he added.

The HP system was chosen on its data base management capability and Query software and also because "we needed a fast-moving computer system that could grow with us. We can build a distributed system with additional processors at branch offices later on. We can easily double our processing capability with a second processor," he added.

"The small system, like EBI, is young and not steeped in tradition. Many of the older insurance companies have large mainframes and it's extremely difficult for them to change directions in data processing," Brown commented.

"The distributed processing approach means flexibilty and it's affordable to us while leaving room for growth. It will be much smoother to go from a one processor system to a multiple processor system than it would be to go from a mini to a large mainframe. In the future, we can download operating programs from a central control CPU through the network to the other processors on the system. Programming would be made at the central system," he said.

Marketing Tool

Using the on-line system, members of the staff can retrieve claim details or summary information necessary to analyze accident or injury data. According to Brown, the on-line information system is an extremely useful marketing tool and a means of retaining a personalized and responsive claim service.

A claimant's question can be answered in seconds, such as whether a claim has been paid and when, and where the check was mailed. EBI managers can review the loss data and project trends and profitability.

By using HP Image/3000 and Query software packages, data storage, retrieval and manipulation can be performed without having to develop special programs, Brown noted. Listings of information that managers may be interested in studying are presented on the computer terminals — for example, all labor class categories for which the loss ratio (loss divided by premium) is greater than a given fraction.

The HP data base management software will respond to the Query language commands that employ such words as "find," "sort," and "report," by displaying all the desired categories. The user may then explore the least or most profitable portion of the business further by sorting in various ways and asking for more details.

"Being on-line is the key to service,"

(Continued on Page S/23)

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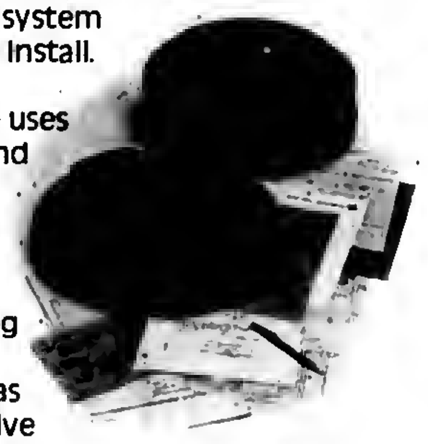

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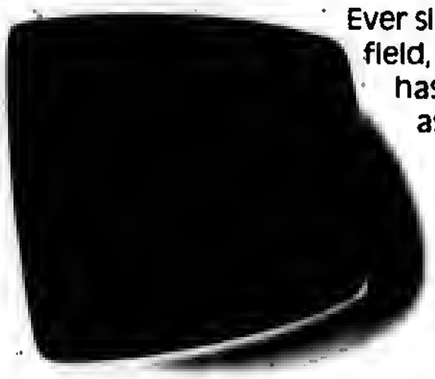

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32-Bit Minis on the Rise

(Continued from Page S/12)

more development energy and dollars on peripherals, software and interfaces.

The minicomputer manufacturer was inspired to respond to the system OEM because the product OEM market represented a decreasing source of unit volume profits as the price of CPUs and memories fell each year. Thus, manufacturers had to increase unit volume sales to maintain flat net profits. Peripherals and software were good sources for additional revenue. The systems OEM continued to supply applications software, special I/O devices and the human interface.

Most minicomputer manufacturers have dealt little with the commercial end-user market. Here, the computer system need not be particularly price/-performance competitive, but it must be designed for a nontechnical end user.

The system must be reliable enough to run around the clock, seven days a week and foolproof, with a simple human interface. Backup and recovery procedures must ensure that service is uninterrupted.

Seeking to repeat past successes, all minicomputer manufacturers are looking for commercial system OEMs to lead them into new markets. But there are not enough of them to go around, so the mini manufacturers are looking for marketing gurus to develop selected, delimited commercial markets.

Continued growth demands entry into the endless market of commercial applications. This marketing challenge has little to do with 16-bit vs. 32-bit word lengths.

The CPU hardware costs are a minimal factor in the commercial development. But the cost to develop the hardware/software interface to nontechnical users for a myriad of specific applications will be high.

Minicomputer manufacturers understand hardware. The 32-bit word presents fewer limitations than the 16-bit word. One can count on the minicomputer manufacturers to make the 32-bit word minicomputer dominate the minicomputer market.

Bartik is manager of marketing support at Systems Engineering Laboratories, Fort Lauderdale, Fla.

Mini Expedites Lab Procedures

(Continued from Page S/7)

a terminal to display the completed test information and verify it with the original work sheet.

During the day, two interim ward summary reports are printed containing all completed test results as of printing time. These are used by the team leader nurses. The final document for the laboratory is a printout of each patient's test data.

Once a day these printouts are delivered to the medical floors for inclusion in the patient records. Nurses no longer have to "chart" these results as the printout is sized to fit in the patient's chart. Lab reports for all patients are "charted" by one clerical individual on the midnight shift.

Meanwhile the laboratory system moves pertinent patient charge data in blocks of 23 records to the business computer for billing purposes and laboratory financial reports.

The microbiology section also shares the Medlab system, entering its test results on mark sense cards. This information is processed into the patients' records along with the other clinical laboratory data. It also provides the section with cumulative records and reports on the occurrence of bacterial infections.

Installation of the Medlab system was part of Mercy's ongoing building-block approach to the development of a completely computerized, integrated hospital information system. The hospital has a total of 500 beds, admits more than 18,000 patients annually and has a yearly outpatient load of 33,000.

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System Offers Small Firm Control, Expandability

(Continued from Page S/21)

Brown said. "It ensures that our data is accurate and current. Data input to the system is validated by the computer and becomes part of the data base. The system tells us immediately if coverage has expired, even if by only a few hours, for example," Brown explained.

One particular report that has proved valuable to EBI and its insured companies is called the "Loss Analysis Report." Here, a statistical analysis of problem areas is performed, pinpointing the characteristics of accidents at a company. For example, the report covers the time of day when the accidents are occuring, the months or days that are most common, the age of the employees involved, the type of injuries and the typical claim value.

Using this data and analysis, EBI can help its customers improve safety and reduce accidents thereby reducing the costs of workers compensation insurance and the amount of claimant litigation.

Staff More Efficient

While the workload at EBI has doubled in the past six months since the installation of the HP3000, not a single data entry person has been added. According to Brown, the main reason for the improved efficiency of the present staff is the on-line nature of the computer system.

One key application of the system is the printing of claimant checks. To do this, the HP 2645 display station presents a form called a "Claim Payment Entry Form" and the user then enters certain data onto the appropriate fields. The system does the rest.

By entering the claim number; for example, the system produces other data, such as name and address of the claimant, next check number, the company code number, etc. When the amount and payment period are entered, the check is ready to be written on the company check stock, which is placed in the printer. Some five forms are generated on the CRTs, including claim data entry forms for medical and indemnity claims.

The HP 3000 costs about $300,000 or about $8,000/mo. with maintenance. That's a small fraction of the cost of a large system besides the fact that it would not have been possible to have a large system installed, the software developed and functioning in two months. This could not have been done without the Image/Query pair," Brown noted.

The initial programming was accomplished by EBI programmer Barry Gleaton and two part-time programmers working with Cobol and Fortran.

Display stations are located in EBI offices in San Jose, Portland and Santa Monica, as well as in the homes of five of the staff members of the DP department. "Using dial-up lines, any of us can work on the system over the weekend or at night at our convenience. It permits us to deal with an emergency that might arise with a customer at the last minute," he explained.

"We selected the 2645 models [display stations] primarily because we expect to go into synchronous polled communications eventually and these terminals are capable of that using HP-DS/3000 software. The tape cartridge facility on the 2645s (also CRTs) is used for off-line data collection and entry later," Brown said.

EBI now has three offices equipped with data entry terminals and expects to have 12 offices on-line by the end of the year.

The hardware for the system includes the CPU with 512K bytes of memory, a 600 line/min printer, four moving-head disk subsystems with capacity for 50M bytes each, 25 CRT terminals, three 180 char./sec printers; a hard-copy facsimile machine that can copy a CRT screen and a Codex concentrator used for multiplex communications to Portland at 9,600 bit/sec.

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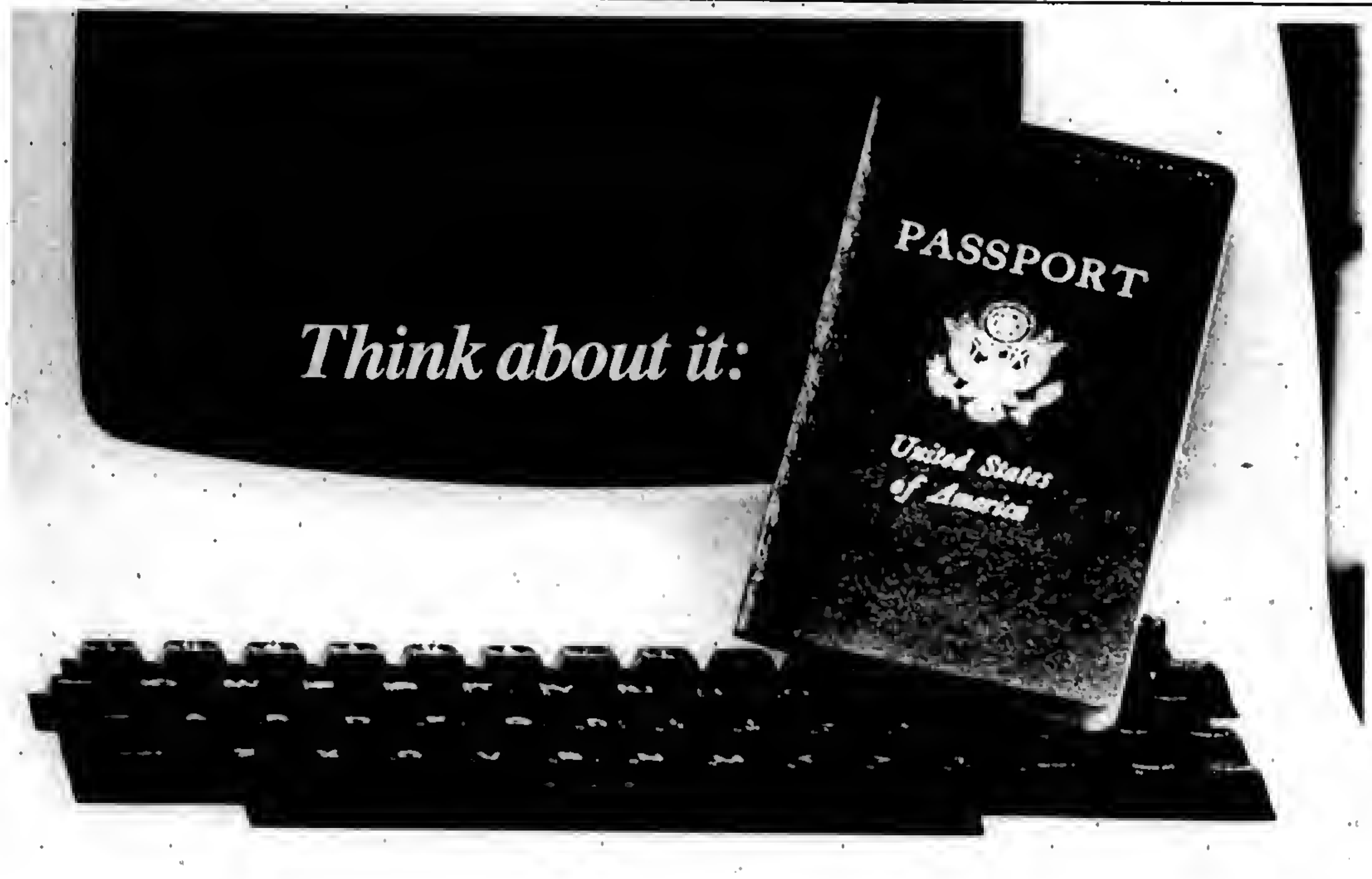

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One important aspect of that potential relates to the integration of the local processing and communications capabilities of these systems with Tymshare's extensive computer service network. Backed up by Tymshare support, these small systems, highly efficient for certain tasks and relatively low cost, can free many companies from the traditional shackles of the standard mainframe. In fact, in many cases the combination can do away with the need altogether for the expensive and increasingly hard to justify in-house mainframe unit.

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Designer's Challenge

Low-Cost Peripherals Needed to Fill Micro Gap

By Joel A. Kramer
Special to CW

The much heralded microprocessor revolution, which is supposed to bring digital intelligence to the very fingertips of commerce and industry, has produced "smart" games, washing machines, electric ovens, sewing machines, etc., but has done precious little to bring clerical automation to your friendly neighborhood drug store. In fact, very few ma-and-pa type businesses could justify today's cost of DP systems. This fact seems strange with microprocessors going for around $30 a clip.

Peripherals Bottleneck

The problem lies in the cost of peripherals, rather than the computing hardware itself. By and large, "smart" appliances don't require input terminals, output printers or data storage devices, whereas small business systems do.

The semiconductor industry's phenomenal ability to squeeze more and more circuits onto a tiny sliver of chemically processed silicon has produced a 1,000-fold decrease in the price of computing circuitry over the past decade.

Unfortunately, production costs for keyboards, CRTs, servomotors, print mechanisms and other peripheral "ingredients" are far less amenable to comparable price reductions.

The remarkable fact is that peripheral equipment manufacturers have been able to turn from equipment for multimillion dollar centralized DP systems to peripherals for the past decade's minicomputer explosion. Prior to the minicomputer's development, peripherals alone were priced at several times the cost of a typical mini: a $2 million computer could easily support a $35,000 line printer.

Consequently, until Centronics Data Corp. brought out its high-speed serial printer, minicomputer users requiring appreciable hard copy were obliged to purchase a $10,000-upwards line printer. That, along with other large-computer peripherals, left minicomputer users in the position of using a steam hammer to crack a nut.

Gradually, peripherals manufacturers rose to the minicomputer challenge, creating an entirely new generation of input/output/storage, devices whose price and performance were geared to the mini's orders-of-magnitude lower cost and throughput levels.

In some instances, the mini's reduced DP horsepower permitted fresh peripherals approaches; in others, the growing pattern of distributed DP paved the way for new peripherals concepts.

Now the microprocessor brings a fresh round of challenges to the peripherals industry. Doubtless, it will spawn a new wave of entrepreneurial firms which, along with present-day contenders, will develop low-cost peripherals for microprocessor-based systems.

It's like a rerun of the earlier minicomputer revolution . . . except that today's minicomputer peripherals are the "biggies" that have proven uneconomical for ma-and-pa business automation.

Uniqueness of Market

The market size for computer systems is a direction function of hardware cost and can be portrayed as a pyramid as shown in Figure 1. The number of applications for computer systems increases as the number of users increase. At the apex of the pyramid we find the monstrous computer systems manufactured by IBM, Amdahl and the like that sell for millions of dollars and for which a limited user market exists.

Next we have the medium-scale computer systems, the requirements for which the IBM 360 series did such a remarkable job of fulfilling.

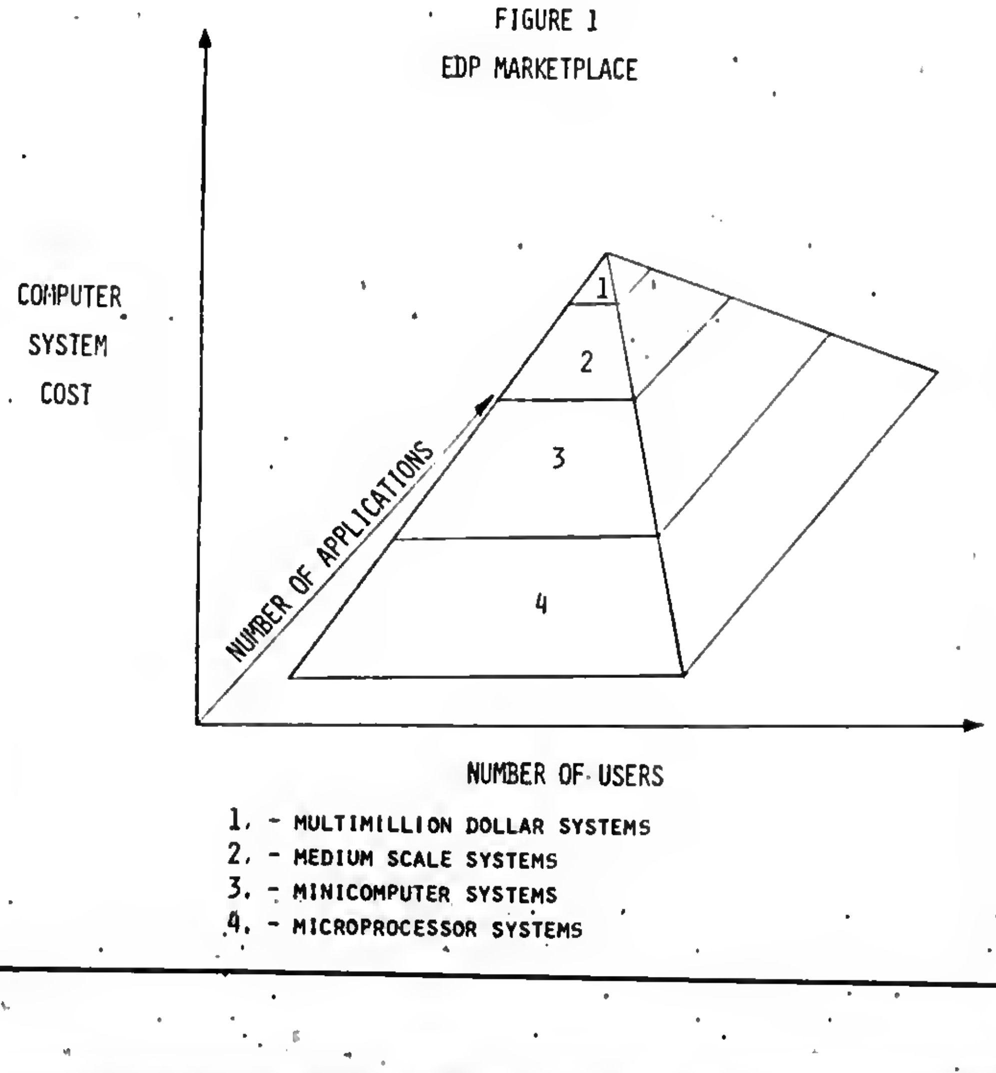
The third slice of the pyramid represents the minicomputer systems characterized by the Digital Equipment Corp. PDP-8 in the 1960s and the PDP-11 in the 1970s. To date, the installed mainframe base is in excess of 50,000 minicomputers of these types.

Widespread utilization of these machines was made possible by cost reductions in mainframes and the associated peripehrals. In many instances, these systems were utilized in an environment containing sophisticated technical personnel who could understand the complexities of the hardware and rationalize "downtime." A telephone call would dispatch a serviceman, usually within hours, to restore the system to normal operation.

Now, an entirely new breed of systems depicted by the base of the pyramid will be dispersed to the general public, which lacks the sophistication of the minicomputer user. As a

(Continued on Page S/26)

FIGURE 1
EDP MARKETPLACE


COMPUTER SYSTEM COST
NUMBER OF APPLICATIONS
1
2
3
4
NUMBER OF USERS
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2. - MEDIUM SCALE SYSTEMS
3. - MINICOMPUTER SYSTEMS
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MINICOMPUTER IPI SOFTWARE

Magnetic Media Prevail in Microperipheral Area

By Joel A. Kramer
Special to CW

	Reel-to-Reel (10-1/2 in. Reel)	Cartridge (3M DC300A)	Mini-Cartridge (3M DC100A)	Phillips Cassette	Floppy Disk	Mini-Floppy Disk
Capacity (1,000 bytes per block for tape, 128 bytes per sector for disk)	25×10^6	2.5×10^6	560,000	225,000	250,000	88,000
Data Transfer Rate (Typical bit/sec)	250,000	48,000	48,000	10,000	250,000	125,000
Access Time (Average)	10 min.	20 sec.	10 sec.	20 sec.	200 msec	566 msec
Transport Size (Typical)	19x12x12	4x10x7	4x3x4	4x5x6	10x4x16	3x6x8
Cost (With power supply and formatter)	$5,000	$2,500	$1,200	$2,200	$2,500	$1,300

Comparison of Various Magnetic Recording Subsystems

The need for data storage on microcomputers has typically been filled by devices that employ magnetic media. A quick review of these methods is given below.

IBM-Compatible Reel-to-Reel Tape Drives: This method of data storage was the first implementation of removable magnetic media data storage. It ultimately became the backbone of the large centralized DP installations.

For tape velocities exceeding about 45 in./sec, designers developed vacuum column buffering methods. Recently, our firm developed the Model TDX 75 in./sec tape drive that uses a new mechanical rather than vacuum column buffering technique, called the Floating Shuttle, which we think overcomes the problems of operation at high altitude and restart after power blackout.

Philips Cassettes

Philips cassettes were the only game in town when minicomputer users first sought an economical alternative to the large and costly reel-to-reel tape storage systems. Consequently, despite the cassette's slow data transfer rate, poor data integrity and lack of mechanical reliability, it has gained fairly widespread usage among the less demanding applications.

Even with the low cost, however, the Philips cassette, in its modified digital incarnation, will probably prove to be a transitional device. It has provided a storage medium reserved for remote data logging, memory for automated typewriters, low-cost replacement for punched paper tape and so forth.

Floppy Disks: Approximately five years ago, the peripherals industry took a device developed by IBM as part of a programmable controller, known as a floppy disk, and converted it to a minicomputer peripheral. Needless to say, it was an instant success. For less than $3,000 one could implement a dual floppy disk system on a minicomputer. The floppy disk provides a capacity of 250,000 bytes of data with an average access time of 200 msec.

3M Standard Data Cartridge: About the same time that peripheral manufacturers were beginning to design their floppy disk units, the 3M Co. introduced its DC300A data cartridge. Unfortunately, when the media was first introduced there were no drives available.

It was approximately one year before the first drives were shipped, and surprisingly enough, Mohawk Data Sciences delivered before 3M. These units were followed by drives from other vendors.

Since that time, there has been a substantial movement toward industry utilization of the cartridge. Most notable of these is IBM with its Model 5100 desk-top computer, Tektronix with its graphic display terminals and Qantex with its U.S. Navy standard cartridge peripheral.

Microperipheral Storage Devices: There are basically two specific media types that are expected to capture the microsystems market, namely, the new miniature 3M DC100A data cartridge and the miniature floppy disk.

The miniature data cartridge was developed jointly by 3M, under its patents, and Hewlett Packard.

The first mini floppy was introduced by Shugart. Other drive manufacturers have also introduced miniature floppies.

A comparison of various storage media is shown in the figure. This comparison assumes a subsystem with the necessary formatter controller and power supply.

For the microsystem, power requirements will be handled by a total system power supply while the formatter/controller functions will be accomplished by use of LSI circuits.

Tape vs. Disk: The decision between media types requires the designer to perform a detailed analysis of the system requirements.

If rapid random access or fast data transfer is paramount, then the disk is the obvious choice. If data capacity, media durability and convenience, ease of long-term data storage and lower system cost are key requirements, then tape is the best choice.

Other crucial operating parameters might be the length of time it takes to validate a data block just recorded (read-after-write).

The minidrive with a dual-gap head can provide verification 5 msec after the last bit of data has been recorded. For many applications where throughput is important, such as data transmission over phone lines and real-time data logging, this is a critical parameter.

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Beware of Analyses

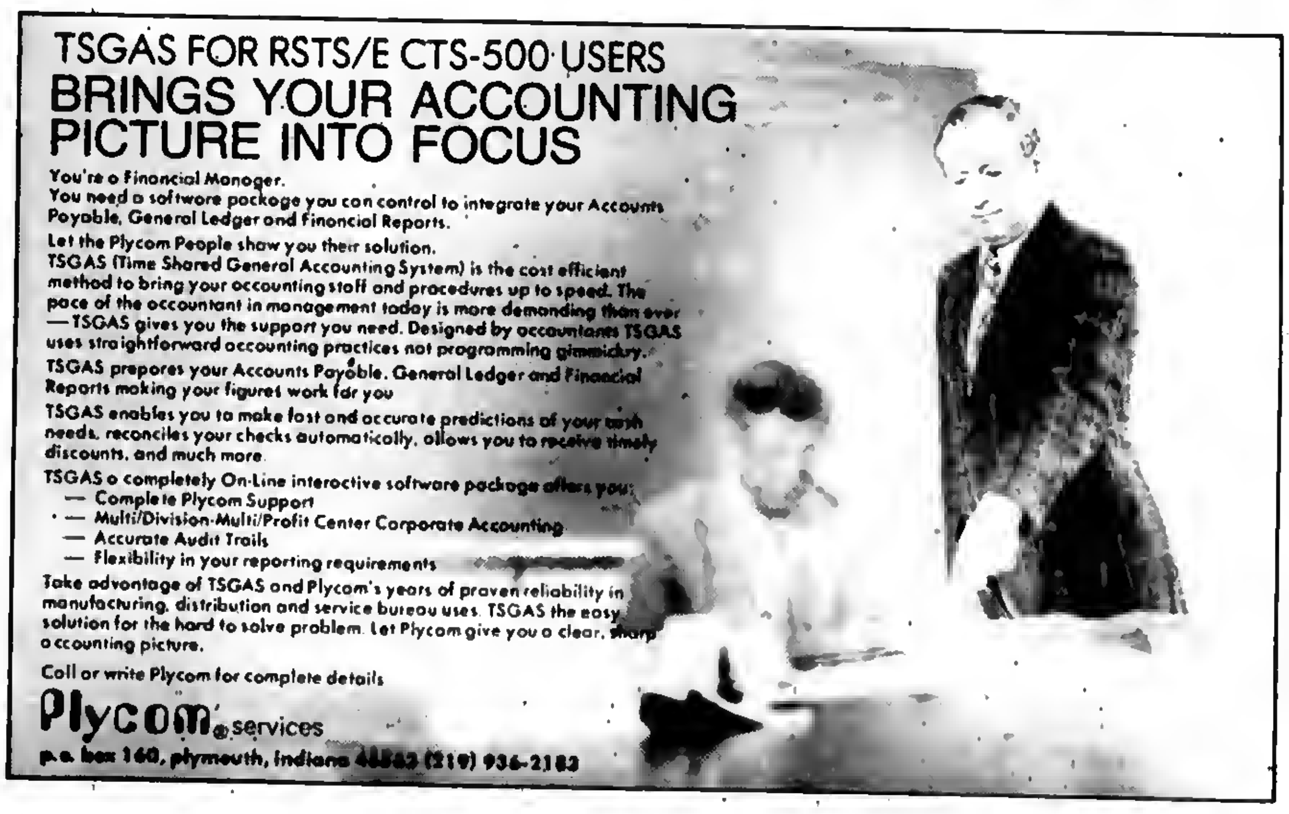
(Continued from Page S/4)

and systems courses available have encouraged businessmen to familiarize themselves with computer system considerations. They develop a vocabulary and confuse that with knowledge.

Proverbially, a little knowledge is a dangerous thing. It would be foolish to tell a businessman to endeavor to keep himself totally ignorant of minicomputer considerations. On the other hand, unless he is willing to devote several years of fulltime effort to becoming an expert, he should endeavor to seek such an expert in making technical evaluations.

The difference between meaning and data is more than one of semantics. Frequently, it is one of dollars and cents and of success or failure.

David is president of Minicomputer Industry National Interchange, an association for minicomputer users and others interested in minicomputer technologies. He is also an independent consultant based in Englewood, N.J.



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Small System Unbundling Eroding User Rights

By Lawrence Feidelman
Special to CW

Small computer system architecture is evolving toward implementing more processor functions in software while reducing the proportion of hardware.

In particular, the system software associated with the newer small business computers includes multiterminal, multiprogramming operating systems, microprogrammed logic, utilities, assemblers, compilers for basic programming languages such as RPG-II, Cobol, Basic, as well as businessman English language. In addition, most manufacturers are supplying application software with turnkey systems.

While this situation is definitely beneficial to the small businessman from a technical viewpoint, there is one hitch in this otherwise rosy picture.

The trend is toward unbundling or separately pricing system software. The term unbundling came into being in the early seventies when various outside pressures (if you can believe it) caused IBM to separately price its equipment and software components.

However, the separate software pricing affected only the compiler, utilities and application software. The unbundling of the application software was the most logical step for vendors to take since application packages must be modified on a customer basis.

As the demands of application program packages for the small business system user began to increase, licensing of software became important.

While no standard software license exists, all of the licensing agreements are designed to restrict the use of the application software package to a particular user on a particular system and to prevent that user from copying the package or reselling it to another user. The basic purpose is to prevent the user from distributing easily made program copies and thereby severely damaging the software developer financially. The DP industry needed to develop licensing due to the inability of the legal system to effectively deal with this software copyright problem.

While licensing has provided an answer to a definite need to protect illegal copying of software, it also has placed some heavy restrictions on the unknowledgeable user.

While the user is paying a sizable amount of money for application programs (which eventually may cost more than the computer system), these programs, unlike the computer, never belong to the user.

The reasoning behind this practice became more a matter of marketing concern than concern over copyright protection. Thus while the user can resell his CPU, magnetic tape drive or printer, reselling even the restrictive single program is not permitted. Most users take this situation in stride and go along with the software licensing agreement.

Recently this separate pricing and licensing of software went one step further — to the operating system itself. The announcements of the Burroughs Corp. B80; IBM System 34 and NCR I-8250 all stated that the operating system is separately priced and licensed. By licensing the operating system, the manufacturer can affect the resalability of the purchased system.

While passing on the operating software to a new user may be just a formality, it appears that the manufacturer still has the final word. While manufacturers claim that software companies can develop operating systems for their computers, it is certainly more difficult and expensive. Therefore, the purchasing user has only rights to the computer hardware that cannot operate without the software.

Following this trend in computer-development to its conclusion, users will discover that most of their systems will be operating under licensed system software and the user will have rights to very little, while paying for everything.

This trend demonstrates an evolving erosion into the computer buyer's rights with nary a wimper from anyone. The small business computer user may be too unknowledgeable or inexperienced to understand this situation. User groups also appear to be very apathetic. As with the previous form of licensing, user inaction will be taken as concurrence by the manufacturers and new forms of computer licensing may be introduced.

It is about time the small business computer users stood up for their rights and got some protection.

Feidelman is president of Management Information Corp., Cherry Hill, N.J.

Peripheral Cost Causes Problem

(Continued from Page S/24)

result, the demands for system reliability are significantly increased.

This end user will not tolerate hardware that requires excessive maintenance or frequent, expensive service calls. The user demands the reliability that his typewriter or calculator achieves. Such a combination of low cost and extremely high reliabiltiy at first seems mutually incompatible.

Therein lies the peripheral builders' major design challenge. Not only must the hardware be offered at low cost, but the system or peripheral must be designed for high "user operational" reliability.

Kramer is president of Qantex, North Atlantic Industries, Inc., Plainview, N.Y.

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Turnkey System Turns Around Account Woes

Special to CW

GARDEN CITY, N.Y. — A turnkey small business system at ABC Hanger and Supply, Inc. here has helped this firm gain control over its accounts receivable and inventory, according to Howard Schulman, vice-president.

The firm, which furnishes ready-to-wear retailers with supplies ranging from hangers to wrapping aids, ships and receives its orders through the mail.

Until April 1976, the $2.5 million company struggled through invoicing with one Friden and one Hermes billing machine. At that time the firm was invoicing customers two and a half weeks after the merchandise was shipped. The merchandise went out on time, but not the invoice, Schulman noted.

Seeking a better alternative, Schulman opted for an IBM System 32, expecting that order entry, accounts receivable and invoicing could be speeded and customer service improved. He hoped to automate inventory as well.

Schulman accepted the System 32 with a 3741 data input station and the accompanying MNAS program. The company was never able to get past order entry and invoicing in nine months with the customized package purchased from IBM.

Schulman hired two extra people who spent every morning assigning account numbers. They punched numbers in, but if nonvalid numbers were entered, they did not find out and merchandise was shipped to the wrong customer. As a result, extra people had to be hired to edit the already entered orders, he added.

Enough Is Enough

By September 1976, Schulman had had enough and looked for a better way. He saw just about every minicomputer manufacturer's system including Basic Four Corp., Nixdorf, Digital Equipment Corp. and Burroughs total responsibility "turnkey" system was the objective, Schulman said.

In November 1976, ABC was contacted by Turnkey Sales & Leasing, Inc., a New York City-based distributor of minicomputer systems. Schulman visited two user installations, saw a demonstration and made the decision to switch. The turnkey house evaluated the company's needs and recommended the Microdata Corp. Reality system.

"Even though their price was $10,000 higher than the other systems we felt it was worth it," Schulman reported.

"Interactivity, immediate real-time response, ability to do whatever we wanted, whenever we wanted it done, was important in the selection," he noted. "Turnkey's approach of providing a system on a customer requirement basis, the use of English and the versatility in extracting information from the system were the things that impressed me," Schulman stated. "Turnkey didn't try to put me into the computer business," he added.

Schulman ordered the Microdata Reality system from Turnkey on Nov. 15, 1976. The system was delivered on schedule, Feb. 9, 1977. In six days, the entire system was operational. After one week, the system processed 1,400 orders and billed 1,000 customers in 10 days.

Sales analysis enables ABC to prepare its catalogs based on which items are selling. Invoices are in the mail the day after shipment so the customer can verify the items and quantities, he ordered and know when and how his order was shipped. Cash flow has improved and credit checks are accurate, Schulman said.

The system also segregates custom items from drop-ship items and warehoused items and will create purchase orders to suppliers of the "specials." Stock items are put on a picking list.

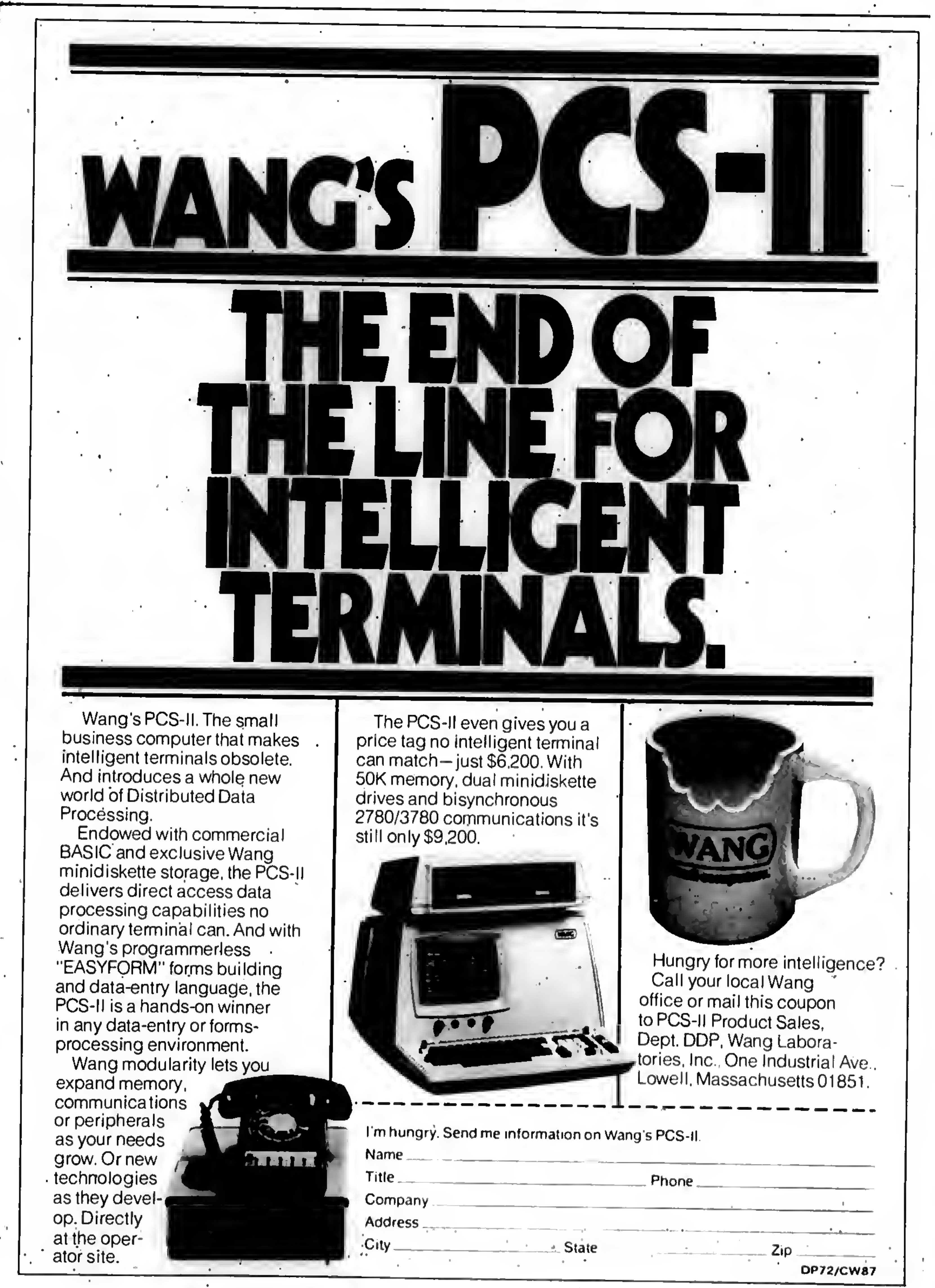
Also, with certain items which are not warehoused on a regular basis, but brought in for shipment, the system recognizes these items, prints them on a picking order and creates a purchase order for vendors with instructions to ship them into ABC's warehouse.

The system also accommodates quantity price differentials and is able to price out any item. The system maintains price breaks as they relate to quantity and posts the right price.

Prepaid Accounting

Another important facet is the handling of multi-item, prepaid orders. The amount of the payment is carried in an order file. Cash is applied to the first shipment.

For example, if a prepaid order for $100 is received and the first shipment is invoiced for $50, the system issues an itemized paid invoice which totals $50 and details $50 credit remaining on the account. If the second shipment is for another $50, the system again issues an itemized paid invoice and states "zero balance." If the second shipment exceeds the outstanding balance (e.g., a $70 shipment), the system issues a paid invoice of $50 with a "balance due" of $20. Account statements are issued at the end of each month.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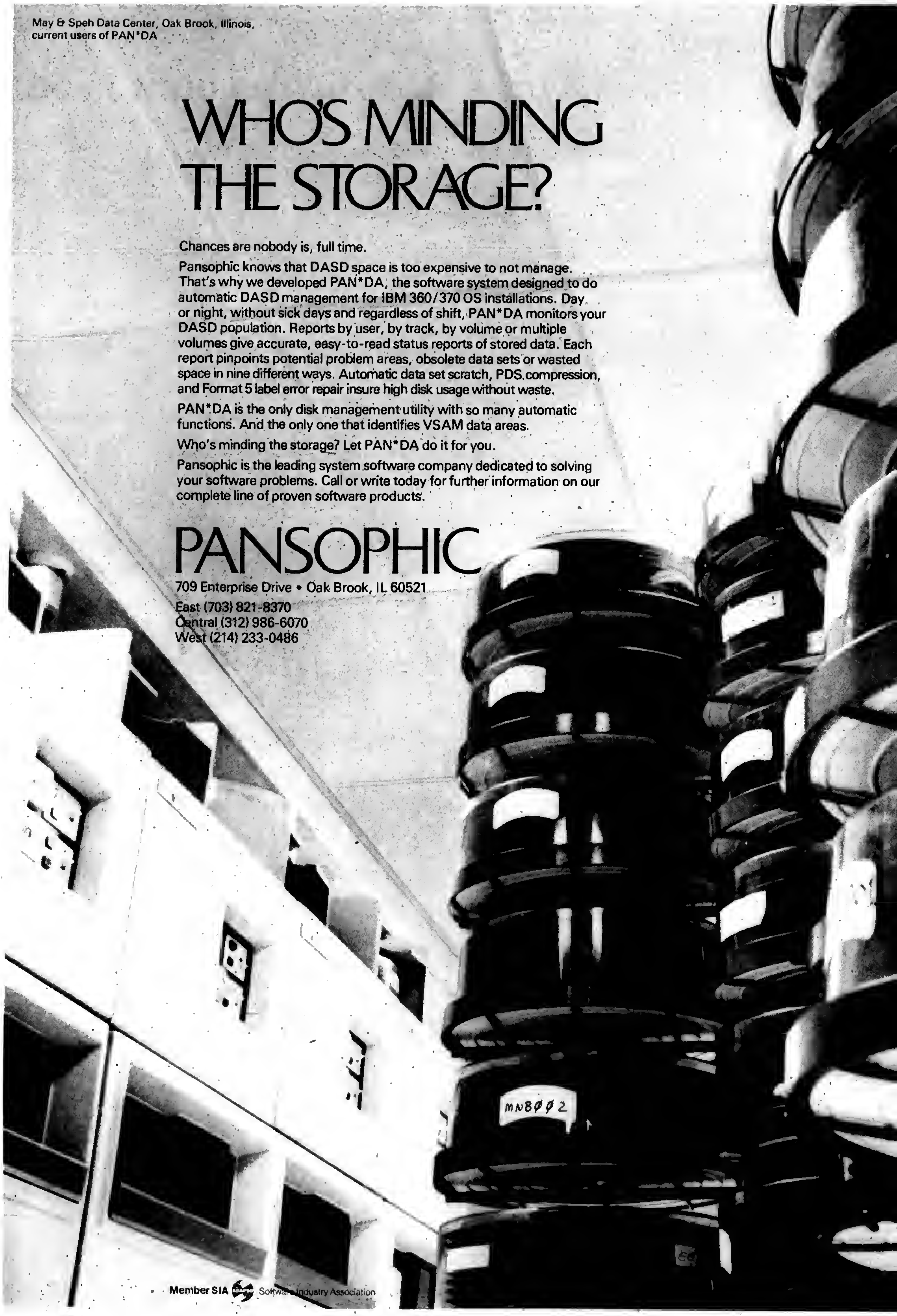

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Micro Bytes

8080 Code Handbook Catalogues Functions

VAN NUYS, Calif. — The *Programmer's 8080 Reference Data Handbook* by West Pulse Engineering here features cross listings for rapid assembly and debug of machine code mnemonics, according to a spokesman.

The handbook has listed the 8080 instructions by functional groups: data movement, arithmetic, logical, control and branching. A complete listing of the 8080 instructions by hexadecimal and octal order as well as an alphabetical listing are provided. The instructions are also classified according to format.

The book provides notes about the unassigned Op-code, full 128-character Ansi Ascii code table with hexadecimal and octal cross conversion, octal and decimal conversion, hexadecimal and decimal conversion and powers of 2, 8 and 16.

The handbook costs $7.95 with quantity discounts available, the spokesman said from 14632 Erwin, Van Nuys, Calif. 91411.

Micro 'Recipe' Book Bows

SAN FRANCISCO — The *Microcomputer Recipe Book* from the Computer Center, Inc. contains information from soup-to-nuts on putting together a microcomputer operating system for personal, business or scientific use.

Under "Ingredients" there are a variety of system components such as microcomputers, semiconductor and floppy-disk memories, CRT displays and hard-copy printers. Suggested "Menus" for complete systems range from the "Big Mac," a simple 8080-based computer hooked into the family TV set, to the "Beef Wellington," which includes microcomputer, dual floppy-disk memory, printer and video monitor.

In addition to the menu of computer systems, the recipe book includes a listing of technical books related to hardware design, software development and "How to Do It" books.

The book is free from the Computer Center, Inc., 321 Pacific Ave., San Francisco, Calif. 94111.

Design Manual Covers MCS-48

SANTA CLARA, Calif. — Intel Corp. has announced the *MCS-48 Microcomputer User's Manual*, a 304-page design handbook.

The manual covers design of systems based on the MCS-48 family of single-chip microcomputers, which includes the 8048 microcomputer with read-only memory (ROM) program storage, the 8748 with erasable programmable read-only memory (Eprom) program storage, the 8035 microcomputer and the 8243 I/O expander.

Sections cover microcomputer operation, the use of compatible 8080 and 8085 system peripherals, standard memory components for expansion and both hardware and software applications examples. Data sheets and instruction set are also included.

Copies may be obtained for $5 from the Literature Department, Intel Corp., 3065 Bowers Ave., Santa Clara, Calif. 95051.

Mits/Altair to Sell Icom Line

WOODLAND HILLS, Calif. — The Icom brand of microcomputer peripheral products will be sold in all Mits/Altair retail computer stores, according to a spokesman for Pertec Computer Corp. Pertec manufactures Icom products.

Wintek Hands-On Course To Use Take-Home Micro

LAFAYETTE, Ind. — Wintek Corp. is offering a microprocessor workshop course in which each attendee receives a microcomputer to use at the course and then take home.

The three-day course has both lectures and lab experiments. Topics include computer basics, microprocessor units, memory, I/O, microcomputers, addressing modes, programming, programming aids, processor evaluations and selection, economics, applications and interfacing techniques.

Lab experiments include Fantom-II familiarization, stack pushing and pulling, delay loops, interrupt handler, editor, sort, random number generator and Morse code decoder.

11 Cities

The course will be offered in 11 cities through the end of the year. In six cities, the course will be expanded to include a two-day hands-on interfacing workshop. It consists of analog-to-digital and digital-to-analog conversion, signal conditioning, keyboard scanning/decoding, LED display driving, motor position and velocity control.

The three-day course schedule is:

Sept. 14-16	Dallas, Texas
Oct. 11-13	Melbourne, Fla.
Oct. 18-20	Denver, Colo.
Oct. 26-28	Palo Alto, Calif.
Dec. 6-9	Detroit, Mich.

The five-day course schedule is:

Sept. 19-23	Houston, Texas
Sept. 26-30	Washington, D.C.
Oct. 31-Nov. 4	San Diego, Calif.
Nov. 14-18	Indianapolis, Ind.
Nov. 28-Dec. 2	Boston, Mass.
Dec. 12-16	Chicago, Ill.

A special three-day course will be held Jan. 3-5 at the University of Puerto Rico at Mayaguez.

The three-day workshop costs $499 and the five-day workshop costs $699. The two-day course alone costs $299 and the special January course costs $599. Prices include tuition, course book, all course materials, graduation certificate and take-home microcomputer. A 20% discount is available with five or more enrollments from the same firm. For information, contact Wintek at 902 N. 9th St., Lafayette, Ind. 47904.

8800b Gets Data Base System

BLACKSBURG, Va. — The Personal Data Management System (PDMS), a data base system for personal microcomputers, has been developed by Physical Biological Sciences (PBS) Ltd. here.

The first PDMS system is for the Altair 8800b with one or two floppy disks at a minimum of 32K bytes of core memory. Additional versions for cassette systems are under development, according to a spokesman.

The interactive PDMS system allows the 8800b user to set up a new file by issuing a RUN command. Once the file is set, the user may ADD, LIST or DELETE records in sequence or selectively. A RESTORE command actuates previously deleted records. A CHANGE command allows changes to be made in existing records of a file, and a SEARCH command searches a field for a string as well as an integer value of fields, the spokesman explained.

A 40-page user's manual, when provided with the system disk, contains the source listing of the program. The PDMS costs $795 from the firm at P.O. Box 47, Blacksburg, Va. 24060. The manual without source code can be purchased for $20.

Two Boards Expand Z80 Series

CUPERTINO, Calif. — Zilog, Inc. has expanded its family of Z80-based microcomputer boards (MCB) by adding a video display board, an I/O board and a serial I/O board.

The Z80-VDB video display board interfaces Zilog's standard Z80 microcomputer board directly to the transistor-to-transistor logic (TTL) horizontal, vertical and video drives of a standard TV monitor. Containing 256 bytes of dynamic random-access memory (RAM) for line buffering to the MCB, the board accommodates 64 uppercase Ascii characters and display size of 24 lines, 80 char./line. Price of the Z80-VDB is $475.

The Z80-IOB board provides users with programmable control of up to 64 I/O lines. The board, containing four Z80-PIO parallel interface controllers, sells for $350.

The Z80-SIB serial I/O board provides eight serial (four full-duplex) channels, each capable of synchronous or asynchronous data transmission including Bisync protocol. Featuring two on-board Z80-CTC programmable timers, the Z80-SIB is priced at $375 from Zilog at 10460 Bubb Road, Cupertino, Calif. 95014.

Microcyber 1000 Based on 6502

HUNTSVILLE, Ala. — Cybersystems, Inc. has introduced the Microcyber 1000 microcomputer system. The Micocyber 1000 is based on the 6502 chip and comes assembled and ready to plug in, according to a spokesman.

The unit includes 1K of random-access memory (RAM) and 2K of read-only memory (ROM). The ROM contains the operating system for the cold-start bootstrap, teletypewriter handles, keyboard and display handlers and audio cassette handlers, he said.

The Microcyber 1000 comes with a full hexadecimal keyboard and 7-digit light-emitting diode (LED) display for address and data. A single-board expansion capability is contained within the basic chassis and the expansion can be either memory or I/O board. A 72-pin I/O and memory expansion bus connector is included with the system to permit further expansion, the spokesman added.

The Microcyber 1000 sells for $525 and comes with a 90-day warranty. Additional static RAM is available in 4K increments for $189 and in 8K increments for $299 from the firm at 4306 Governors Drive W., Huntsville, Ala. 35805.

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Micro Club Listing

Microcomputing clubs are drawing more and more interest all across the country. It is sometimes difficult, however, to find one that serves your area of the country.

As a service to hobbyist readers, *Computerworld* would like to periodically list the micro clubs in different parts of the country.

If you are a member of a microcomputer club and would like it to be listed, contact Frank Vaughan at *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Please provide the full name, address and telephone number of the club.

Micro Stores 17K Bytes

NATICK, Mass. — A Z80-based single-board microcomputer with a capacity for 17K bytes of on-board memory is available from Control Logic, Inc. here.

The CCS-1143 contains the Z80 microprocessor unit (MPU), 1K byte of random-access memory (RAM) and sockets for up to 16K bytes of erasable, programmable read-only memory (Eprom). It also has a serial interface for either current-loop or RS-232 serial devices, a 2MHz system clock and MPU support hardware and logic for I/O to users' devices, a spokesman said.

The unit is suitable for applications requiring large program or fixed data memories such as control or switching uses, the spokesman said.

The memory-mapped and bussed I/O structure of the CCS-1143 permits the user to employ the memory reference instructions of the Z80 MPU, according to the spokesman.

Additional features include automatic power-on restart, jumper-selectable serial I/O data rates, interrupt capability and direct memory access.

The CCS-1143 costs $500 from the firm at 9 Tech Circle, Natick, Mass. 01760.

Package Handles 3D Perspective

CULVER CITY, Calif. — Sublogic Co. here has introduced a micrographics package that allows a user to view two-dimensional perspective projections of three-dimensional scenes from any locations in space, a spokesman claimed.

Two versions of the graphics package are being offered.

Adaptation instructions, program listings, applications, interface and testing information are supplied with each package. The Basic version will retail for $22 and the 6800 Assembly Language package will cost slightly more from the firm at P.O. Box 3442, Culver City, Calif. 90230.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Withington Testimony

IBM Could Force Others Out: Trial

By Molly Upton
CW Staff

NEW YORK — IBM has the financial resources to put a variety of firms out of business, computer industry expert Frederic G. Withington testified at the U.S. vs. IBM trial here recently.

If IBM were to make products designed specifically for users of Burroughs, Honeywell, or Univac systems and price them low enough, it could force these firms out of business and survive, the Arthur D. Little, Inc. researcher said.

And, IBM could similarly force out of business plug-compatible suppliers in the areas of add-on memories, tape and disk drives and CPUs and still be alive, he added.

Much of Withington's testimony on redirect examination has been devoted to his predictions. Judge David N. Edelstein queried him extensively on the significance of such items as new memory technologies and IBM's use of microcode.

Since Amdahl Corp's 470V/6 lacks a control store, there is no way it can provide the equivalent to IBM's MVS extension Withington noted. IBM's MVS extension incorporates some systems programs in microcode in the control store for reportedly greater throughput, he said.

Withington expects IBM to increase the number of key systems programs in microcode, thus rendering hard-wired machines incompatible.

Edelstein asked Withington whether he considers the use of microcode a "technological miracle" that could hinder entrance into the computer industry.

Withington said no, not in itself. However, in the future, it is conceivable that microprogramming could seem close to a technological miracle, he said.

Edelstein used the term "technological miracle" to refer to a technique that incorporates price/performance, compatibility and functionality or ease of use, Withington explained later.

The judge also asked Withington whether the mirocode expected to be released with the IBM 3033 could be copied. The witness estimated five or 10 people could "replicate a functional alternative" in six months to a year if they had the code with which to work.

Other mainframers have more ways of being competitive with IBM than the plug-compatible mainframers, which must either duplicate IBM's CPUs or make their products look like duplicates he said. The other mainframers can select a variety of methods through which to offer equivalent or better price/-performance.

Withington suggested that perhaps other mainframers might make more suitable markets for plug-compatible mainframers than IBM, since several plug-compatible mainframers are already concentrating on IBM.

The general-purpose systems of Honeywell, Univac and Burroughs are lower in price than IBM's and their installed bases are smaller. As a result, they probably have less leeway in cutting prices — and in innovating new products — than IBM does, he indicated.

Disk drives of an improved sort will remain the dominant memory technology through at least 1985, Withington said.

Adaptation Cost

The cost to one company to adapt or develop systems to use these different technologies, which organize the storage of data in smaller blocks will be $10 million to $50 million, Withington estimated. Two-thirds to three-quarters of this expense will be in software, he added.

Lead government attorney Raymond M. Carlson produced two IBM documents that substantiated Withington's earlier testimony that it would have cost about $300 million for a firm to

Continued on Page 43)

Telecommunications Seen Ripe For More Mini Firm Participation

By Toni Wiseman
CW Staff

CHICAGO — The telecommunications industry is ripe for increasing participation by minicomputer companies, Harry Newton, an independent telecommunications consultant, told top industry executives here.

Minicomputer companies have the technology and the problem solution and industry segmentation marketing skills to make a significant impact on this industry," Newton said at the Computer & Communications Industry Association's (CCIA) annual membership meeting.

Yet, despite the available enthusiasm, marketing and technical skills, only two companies to date have ventured actively into the voice area as end-user suppliers. These two are Rolm Corp., which markets a computerized PABX, and Datapoint Corp., which has developed InfoSwitch, a mini-based least-cost telephone routing system, he said.

Newton compared DP with communications, pointing out that the telecommunications market is 50% larger than that of DP.

Telephone industry revenues, for instance, were $41.19 billion in 1977. This includes $16.6 billion in local exchange revenues, $1.5 billion from interstate toll and Wats, $1.2 billion from interstate private lines, $8.3 billion from intrastate toll and $3.7 billion from PABXs and key sets.

DP industry revenues, on the other hand, amounted to only $27.9 billion in 1977, he noted. Mainframes accounted for $7.2 billion; peripherals for $10.8 billion, software and services $5.1 billion, supplies $2.4 billion and minicomputers $2.4 billion.

R&D Orientation

Another reason minicomputers have a definite opportunity in the voice telecommunications industry is the intense R&D orientation of the DP industry as compared with telecommunications firms, Newton said.

In 1975, AT&T spent $619.4 million or 2.1% of sales on R&D, General Telephone and Electronics spent $93.7 million or 1.6% of sales, ITT spent $219 million or 1.9% and RCA $113.6 million or 2.4%.

In the same year, Data General Corp. spent $11.6 million or 10.8% of sales on R&D, Digital Equipment Corp. $48.5 million or 9.1%, IBM $946 million or 6.6% and Hewlett-Packard $89.6 million or 9.1%, he stated.

But, the profitability of the communications industry is very, very high and thus very enticing, he pointed out. IBM realized a 14.7% profit in 1976 while AT&T accumulated an 11.6% profit on sales that year. This compares with an average 5% profit for the Fortune 500 companies, Newton said.

Newton further compared the two giants, IBM and AT&T, in terms of revenues, expenditures and depreciation issues.

For the year ended December 1976, AT&T had revenues of $32.8 billion, or 2.01 times IBM's $16.3 billion. AT&T's earnings were $3.8 billion or 1.58 times IBM's $2.4 billion, he noted.

On the other hand, AT&T's long-term debt is $32.5 billion, 118 times IBM's 275 million, which is in itself negligible since IBM had $6 billion in cash assets at the end of the year.

AT&T's total plant and equipment amount to $91.3 billion but will take 20.3 years to depreciate at the 1976 rate, Newton said, adding IBM's $16.1 billion plant and equipment will take only 9.4 years to depreciate at the 1976 rate.

Buyer Conservatism

But the major concern with marketing to the end-user in the telecommunications industry has been the erstwhile conservatism of the average communications buyer, Newton told the CCIA members.

However, this is changing; interconnect's present popularity is growing for several reasons:

- The manufacturers are offering equipment with popular features not available from the telephone companies.
- The manufacturers are standing behind their distributors, backing up installations with manufacturer guarantees.

(Continued on Page 42)

CI Notes

Itel, Siemens Agree To Joint Project

SAN FRANCISCO — Itel Corp. has entered into an agreement with Siemens A.G. (Germany) for the joint development of IBM-compatible nonimpact laser printer subsystems.

Itel intends to add products developed under this agreement to its existing computer and peripheral line.

The initial Itel printing subsystem will utilize the ND-2 laser printer, a product designed and manufactured by Siemens A.G., and will be plug-to-plug compatible with the IBM 3800.

Dataforce Takes Control Of Randal Maintenance

TORRANCE, Calif. — The Dataforce Service Co. has taken control of a nationwide network of 115 organizations providing maintenance for Randal Data Systems small business computers.

While it intends to continue providing service to Randal Data, Dataforce will also seek maintenance contracts for other types of minicomputer systems, according to Dataforce president, Jack Tateel.

A central diagnostic center has been established at Dataforce's headquarters, 2807-F Oregon Court, Torrance, Calif.

The company is wholly owned by Randal Data Systems, Inc., but will operate independently.

Supershorts

Centronics Data Computer Corp. has filed a claim against Mannesmann and SCI with the U.S. International Trade Commission demanding an import embargo on the printers.

Data Magnetics Corp. has formed a Tape Products Division to handle the manufacture and marketing of a new line of digital tape heads.

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Army Cancels CDC System As Interim DOD Standard

By Edith Holmes
CW Staff

WASHINGTON, D.C. – The Army Electronics Command recently canceled its sole source designation of Control Data Corp.'s 480 system architecture as the interim standard for all U.S. military operations.

In the wake of industry criticism, the Army plans to go out for competitive bids to select the interim tactical computer architecture that will serve as a basis for the Military Computer Family (MCF) to be used by all branches of the Department of Defense (DOD), a spokesman for the command said.

Digital Equipment Corp.'s PDP-11 has already been selected by the command as the ultimate standard MCF architecture [CW, Aug. 8], the spokesman added. But since few militarized PDP-11 CPUs are currently in the field, the Army is trying to find an interim architecture to save existing tactical computer systems.

The computer industry was informed in July that the Army, in cooperation with the Navy, had chosen the CDC 480. Army officials said the 480 was selected as the interim machine architecture because it is compatible with CDC's AN/AYK-14 standard Navy airborne computer and Litton Industries' AN/GYK-12 emulator.

Industry representatives objected strenuously to the DOD move toward CDC during a July industry advisory group meeting. Competitors argued CDC would gain a lead position in the eventual supply of hardware modules to the military if the features of its equipment were made standard without "a thorough objective and written analysis."

Mini Users Gain Special Support

ANDOVER, Mass. – Software International Corp. has formed a new group devoted exclusively to software package support of small systems and minicomputer users.

"Users of small computers, just like those who employ large-scale machines, are faced with making their machines produce application results. Since the cost of in-house or contract programming can be prohibitive, small systems users should be able to take advantage of field-tested and proven software application packages," according to Chester J. Domoracki, small systems group vice-president.

With more than 100 installations of Software International's small systems packages already at work on various sizes of IBM System 3 computers, the firm is now designing a broader product line offering. Software International's general ledger, accounts receivable and accounts payable are already on the market with on-line versions as well, Domoracki noted.

Basic financial reporting systems for the following popular small or minicomputer manufacturers are either available or being planned from Software International's new small systems group: Burroughs, Digital Equipment Corp., Data General, Hewlett-Packard and Interdata. The needs of IBM System 32 and System 34 will also be met soon," he said.

Milgo Name Change

MIAMI – Milgo Electronic Corp. has been renamed Racal-Milgo, Inc. as a result of its merger into the Racal Group.

Edward Bleckner Jr. will serve as president of Racal-Milgo, along with Raymond Colucci, vice-president/operations; Matthew A. Kenney, vice-president/sales and marketing; Paul E. Payne, vice-president/engineering; Charles Weston, vice-president/finance; and Sang Youn Whang, vice-president/research.

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The better business decision

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Panel Sees Eventual Standards For Graphics

By Toni Wiseman
CW Staff

TORONTO — Members of an Ifip '77 panel on computer graphics agreed that there is an exciting future in store for that discipline, one which includes discernible trends, innovations and the certainty of standards.

K.Bo, who participated in the development of GPGS/Fortran in Norway, said he foresaw three trends, the most important of which is that computer graphics are penetrating into industry. Even smaller firms have begun to recognize what they can gain from using computer graphics, he said.

He noted, however, that to reach the goal of widespread use of graphics it will be necessary for the DP industry to support development, increase knowledge and provide standards.

Secondly, Bo noted that one reason computer graphics have encountered difficulty in widespread use is due to the isolation of the educational world, which is the prime user of the technology. "To get individuals to accept computer graphics, we have to offer them professional implementation, education and maintenance," he stated.

Finally, while technology has a good grip on the control and understanding of line graphics, it is a primitive usage, he said. Graphics today are using one dimension to stimulate two- and three-dimensional objects. In the future, he predicted, two-dimensional primitives, such as polygons, will be common.

"This field is now moving very fast. In order to keep up, I urge you to keep an eye on the raster scan approach and on holography," Bo said.

Changing Slowly

Tom Sancha, founder of Cambridge Interactive Systems, Ltd. in Great Britain, tried to tread the line between what will happen in the future and what should happen.

Sancha divided graphics into two "worlds": the old world of vector graphics and the new world of raster graphics. Vectors will diversify as more things become possible through the application of LSI technology, he predicted. There will be changes, but they will not be radical, he said.

In the raster area, the changes will come from the low end of the market. "Rasters will probably never compete with vector graphics, for instance in engineering, he noted, because the requisite resolution is not available. But the use of enhanced video display units will prove very cost-effective and cause the raster market to take off," he said.

He also predicted that as graphics terminals become more widely used within organizations by more users, the demand for hard copy will diminish — a prediction one attendee termed "naive."

Standards, he observed, are the only way to provide wide availability of applications. These standards, he added, will be adopted by government and large industry and will constrain the user, "but we'll have to live with them."

Jim Foley, graphics editor for the Communications of the ACM, agreed that standards are coming, setting a five- to 10-year time frame for their implementation.

Standards, he said, will result in relative program portability and eliminate the need for major program changes. They will also result in program affordability, a major and practical impact for the expansion of computer graphics.

There are currently five separate groups working on graphics standards projects, all working closely together and cooperating toward the same objective, he said. To date, however, only a single standard — one for line drawing systems developed by the ACM Siggraph group — has been proposed.

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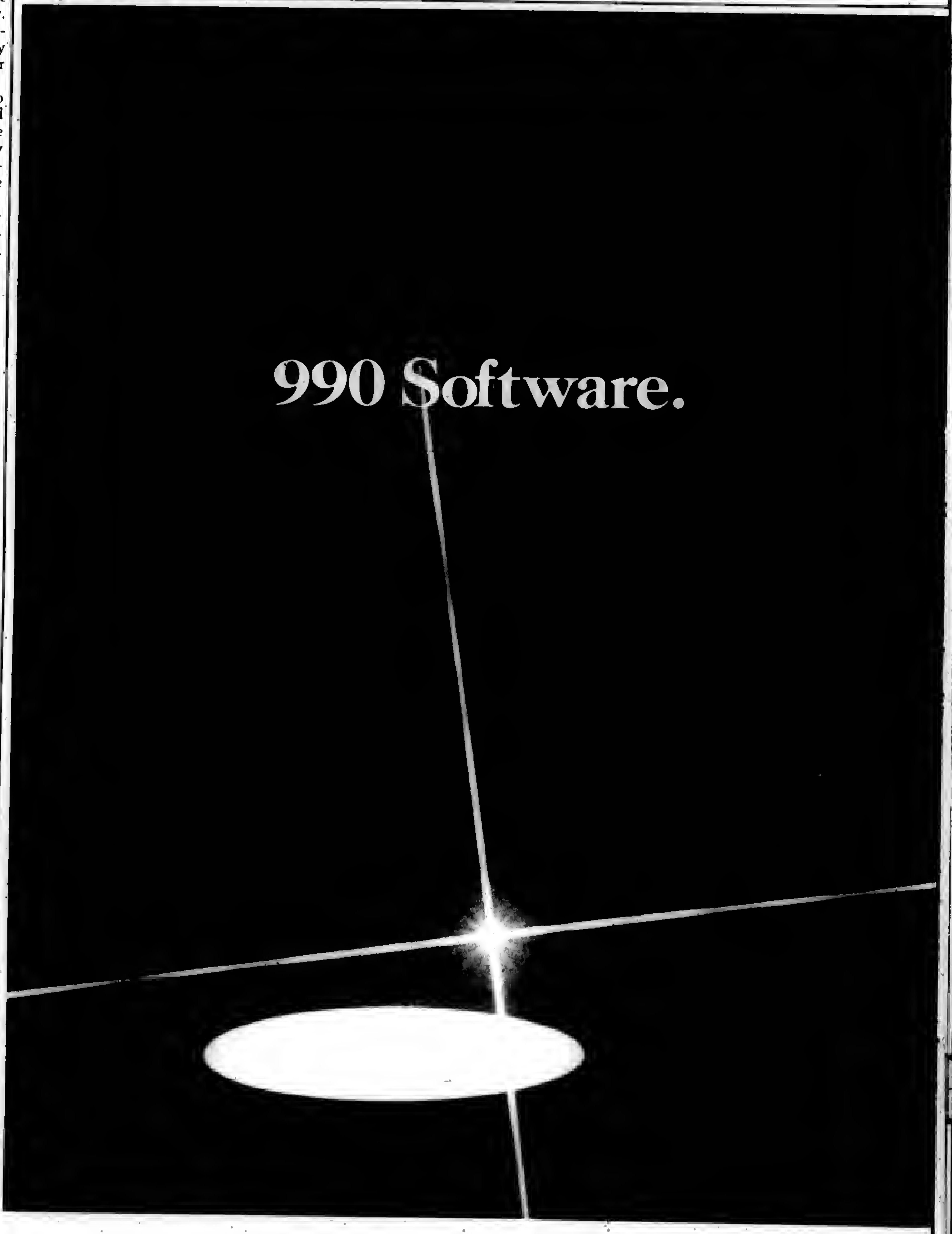
990 Software.

Small Systems Becoming Chief Market

Floppy Media Sales Seen Climbing 40%/Year

By Molly Upton
CW Staff

WELLESLEY, Mass. – Shipments of floppy disk drives should rise at an annual rate of 33% over the next five years, while diskettes will rise 40% per year over the same period, according to a study from Venture Development Corp. here.

In 1981 the drive market should reach 605,000 units per year and sales of diskettes 18.7 million per year, the study indicated.

The 1976 base of drive shipments was 145,000 units and the media sales were 3.45 million units, according to the report.

Over half of the drive shipments in 1981, or 392,000 units, will be of the IBM-type from OEMs, compared with 103,000 in 1976, Venture indicated.

The only segment of the drive market which will not expand is the non-IBM full size, which should dwindle to nearly zero in shipments by 1981, according to the firm.

The other segments, such as the IBM captive, OEM-IBM type and minifloppies will continue to grow, Venture continued.

Shipments of minifloppy drives will grow from 1,000 units in 1976 to 76,000 in 1981 and should find wide application to hobby computers and word processing systems, the report stated.

Although suitable for desktop computers, Venture sees the minifloppy being challenged by solid-state memories.

Double-density recording codes will be used on 75% of all drives shipped in 1981, the report said.

Dual-sided drives will constitute 40% of 1981 shipments and 35% of all diskette shipments in 1981 will be dual-sided, the firm added.

Minidiskettes should account for 10% of the total diskette market at that time.

IBM holds about one-third of the diskette market and Information Terminals Corp. leads the independents, Venture stated.

Soft sector drives will account for 65% of all drives shipped in 1981 compared with 45% in 1976, the report continued.

Small Systems Use Growing

The predominant market for floppy drives through 1977 will be the intelligent terminal, but in mid-1978 the small business system will become the major consumer, according to the study.

"The transition to small business systems will result from the upgrading of intelligent terminal capabilities to the point where they assume the status of small computers rather than from a collapse of the intelligent terminal market per se," Venture observed.

In a rough breakdown of markets, Venture shows data entry, microcomputers and word processing each consuming about 10,000 units during 1977.

Minis and larger computers together take about 20,000, while small business systems are charted at about 60,000 units in 1977. Intelligent terminals lead with around 90,000 units.

However, in 1981, small business systems will take about 190,000 drives, intelligent terminals 90,000, word processing and micros each about 70,000, followed by large computers and minis with 30,000 and data entry with scarcely more than its original 10,000.

The floppy disk drive study costs $950 from Venture Development at One Washington St., Wellesley, Mass. 02181.

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Telecommunications Market Seen Unique Area

CW at CCIA

CHICAGO — There are several factors that make telecommunications marketing unique, Harry Newton, an independent consultant, suggested to CCIA members here recently.

First, there are regulatory factors, such as the "alphabet soup" of government and semigovernment agencies and associations — Naruc, Usita, OTP, FCC, and state PUCs and PSCs.

In addition, there are the federal courts where everything of significance finally gets decided, Newton said, noting the decisions are made after much delay and usually in the regulatory agency's favor.

Dominance by one supplier is another important factor. AT&T has 930,000 employees and controls 85% of U.S. telephones. Long Lines controls 99% of all long-haul traffic and Western Electric had $7 billion in sales last year, Newton pointed out.

The product life cycle is also important.

Some end-users are writing off PABXs over five years (versus a tax rate of eight years) while earlier versions of Bell central office switches were written off over 40 years, Newton said. Bell equipment is still designed for life cycles and mean-time-between-failures longer than those of any other industry, he said.

This all means that market penetration can take much longer, requiring far greater start-up expenses.

Also, regulation can affect product life cycles, either speeding them up or slowing them down, he said, citing the Federal Communications Commission change to a 40-channel system, which destroyed the 23-channel CB market value.

There are also minimal OEM sales in the telecommunications industry since vertical integration has been the industry practice and standard in order to assure adequate supply and quality products, he said.

Customer psychology is not to be ignored, Newton suggested. There is almost no risktaking in the telecommunications industry, since communications managers cannot "bury" their mistakes.

"Ignorance is bliss in a static monopoly situation, but it is the enemy in today's competitive world," he said, adding that education should be a major part of any marketing effort in this area.

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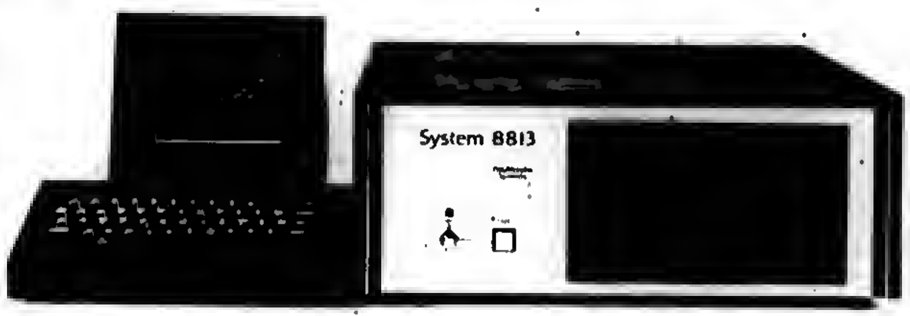

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Field Ripe for Mini Makers

(Continued from Page 37)

- Virtually all the leading independent telephone companies have moved into the interconnect industry, effectively legitimizing it.
- Many independent and some Bell companies are offering the same interconnect equipment interconnect companies are, further legitimizing the industry.
- The newer equipment is small, modular and compact, allowing ease of delivery and installation.
- A secondary market in used interconnect equipment has developed, thus assuring users of a market for equipment they outgrow.
- Bell's most recent prices for PABX and key set systems have been higher than its early dimension and Comkey pricing, thus providing an effective competitive pricing umbrella.
- Users no longer have to be sold on interconnect. If they haven't had first-hand experience, then someone in the same town or the same industry certainly has.
- Consultants are more and more comfortable with recommending interconnect.

This year, Newton forecast, the voice interconnect industry will show sales of $640 million, which includes $400 million for PABX systems, most of which are mini- or micro-controlled, and $15 million to $20 million for mini- or micro-controlled telephone management.

According to surveys Newton has done of the International Communications Association members, the largest communications users in the U.S., 42% say their 1977 bills will be up 10% (an estimate Newton considers very conservative); 83% billback expenses and 25% have billback "bitches." Of those interviewed, 43% did not have major interconnect systems. However, of the 57% who do, 65% are happy with interconnect, 71% are happy with specialized common carriers and 83% are planning more circuits.

Newton predicted that the threat of SBS taking over complete networks of Fortune 500 companies must prompt a new service offering by the Bell System which would provide detailed real-time information on network management and usage for both optimization and billback.

"Such a network will mean the use of data links from voice tandeming switches into a centralized mammoth computer which could be accessed by corporate communication managers," he predicted.

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To Avoid IBM Domain

Growth, Profit Goals Led Adds to OEM Market

By Toni Wiseman
CW Staff

HAUPPAUGE, N.Y. — When Applied Digital Data Systems, Inc. (Adds) went into business eight years ago, management set certain criteria for the company in terms of growth and profit.

To achieve these goals, it decided it had to start with a product that was not IBM-oriented and address a marketplace that was not IBM-dominated. It also decided to develop products with advanced features and become a leader in marketing them, while entering the market on a sales-only basis. This had to be the OEM marketplace, William J. Catacosinos, president and chairman of the board, told the New York Society of Security Analysts recently.

Taking these steps would allow Adds to build a strong company with a very strong capital base, he said. "We felt we had to have strong cash generation and we therefore established for ourselves certain profit goals. Our goal as we grow is to try to maintain profits between 30% and 40% before tax.

"We also believed we had to have an international presence and had to build our overseas business so that it represented 15% or 20% of our total revenues," Catacosinos said.

"We wanted a product that would not be susceptible to being folded into the IBM mainframes as the disk controllers were with the IBM 370 series of computers — a product that could take advantage of advances in solid-state technology and improve the performance-to-cost ratio over a period of time.

"And we wanted to be at the end of the telephone line where we could not be controlled or dominated by an IBM," he stated.

The end result of these deliberations has established Adds as one of the leading suppliers to the OEM Teletype-compatible marketplace.

Adds produces a wide range of products including the 520 and 580 series of desktop Consul terminals as well as the 920 and 980 Consul series.

The strategy would seem to have been successful. Adds revenues have grown from $1.7 million in 1972 to $23.4 million in 1976. Earnings have similarly grown from a loss of $52,303 in 1972 to earnings of $4.6 million in 1976.

Adds' customer base has also grown dramatically, from 212 in 1972 to over 1,000 last year, representing more than 32,000 installed units.

At the National Computer Conference last June, Adds introduced the first members of a new product line based on Intel's latest technology. The new devices, the Regent 100 and 200, will eventually replace the Consul 500 and 900 series, he said.

The Regent 300 is scheduled to be introduced this fall, the Regent 400 in early 1978 and the 500 and 600 shortly thereafter. "These will be user-programmable terminals.

Catacosinos does not subscribe to the theory that "it will be necessary to develop the tremendous processing capability at each of the sites as the proponents of distributed data processing would lead us to believe."

This view, he admitted, involves a risk for Adds. "But we believe it's a worthwhile risk because IBM will prevail in lowering data communications costs.

IBM Seen Potential Threat

(Continued from Page 37)

enter the general-purpose computer systems business with a line of products in 1972.

The Feb. 20, 1970 memos were circulated to B.O. Evans, who was president of IBM's Systems Development Division. J.G. Powers, director of financial analysis for the DP group was the author of the estimates that also went to R.A.Camuso, who became manager of financial analysis at the DP Division, and D.J. Perry, who became manager of financial analysis at the DP group.

Withington had estimated that the cost of entering the general-purpose system business with a line of products would be $300 million in 1972 and $400 million in 1977. The difference in price was split equally between inflation and the added cost of the broader product line that would be needed, he said.

IBM's estimates were $150 million to $500 million. Although the two estimates were on slightly different bases, several aspects were nearly identical.

They each assigned $50 million for plant and working capital.

Withington estimated $100 million for programming support and IBM allocated $90 million, but noted this could grow to $300 million.

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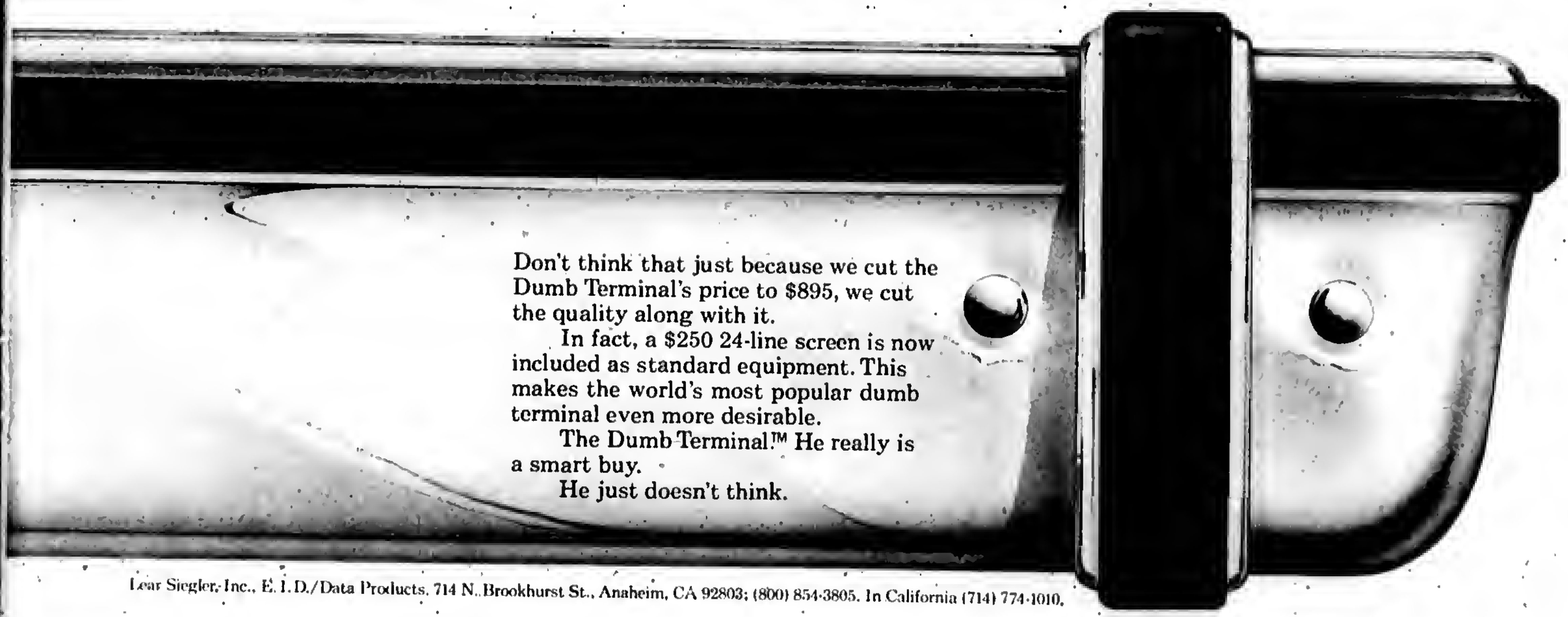

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Financial News

Analysts Bullish on DP Stocks Outlook for Year

By Molly Upton
CW Staff

NEW YORK — Computer industry stocks should continue to outperform the stock market for the rest of the year, according to investment analysts here.

They said the stocks have recently bounced back from a relatively low position after companies announced their recent quarter results.

The results show that margins weren't as adversely affected by IBM's recent pricing moves as people had anticipated, they indicated.

William Easterbrook of Kidder Peabody & Co., Inc. observed the stocks have recently had a "very nice move, and the move they will have in the next six months will be better than the market.

"The major reasons will be that earnings comparisons are going to be better in the second half than in the first, I think, and also there are increasing estimates of capital expenditures for this year and next year, which will favor the industry," he said.

In addition, the negativism among portfolio managers caused by IBM's pricing moves, which was reflected in the low stock prices, has been greatly dissipated, he stated.

"I think the second quarter results, the maintenance and in many cases the improvement in margins, have been major factors as has been the order gains that many of the companies have shown in the second quarter," Easterbrook said.

James Blair, first vice-president of White Weld & Co., observed computer stocks recently have been "super." He indicated the stocks were probably depressed before because people were concerned that profit margins would erode as a result of the price cutting, but they didn't.

Blair's prognostication is that margins look pretty good, and foreign currency trends ought to help the margins a lot, also. He is "pretty optimistic" about the stocks and predicts they will outperform the market.

Harry Edelson of Drexel Burnham Lambert, Inc. indicated nearly all Wall Street analysts were surprised by the second quarter results, which were higher than had been predicted.

Even with the price performance offerings of the IBM 3033, the industry had an excellent quarter, he observed.

"The computer group is showing a lot of vitality and stock market interest has definitely picked up as a group and done much better than the averages."

DEC Revenues Increase 44% Over '76 Level

MAYNARD, Mass. — Digital Equipment Corp.'s fiscal 1977 revenues leaped 44% over 1976 revenues while earnings soared 48%.

Revenues for the year ended July 2 rose to $1.05 billion compared with $736.3 million a year ago.

Earnings for the period climbed to $108.5 million or $2.78 a share compared with $73.4 million or $1.98 a share in the year-ago period.

Fourth-quarter revenues gained 42%, rising to $330.3 million compared with $231.9 million in the 1976 period.

Earnings for the quarter rose to $41 million or $1.05 a share compared to $26.8 million or 70 cents a share in the year-ago quarter.

DEC attributed much of the strength in year-end results to a steady buildup in demand throughout all worldwide markets plus a sustained high order rate which began in fiscal year 1976. To meet the strong customer demand, DEC hired more than 11,000 people during the year.

During the year, DEC acquired or expanded 12 manufacturing plants representing more than 2 million square feet of additional space.These investments; which placed a high level of expense and cost burden on operations, enabled the company to shorten delivery times to customers.

In addition, the company introduced several major products, including the PDP-11/60 mid-range computer, the microprocessor-based PDP-8 and a PDP-11-based distributed plant management system for industrial customers.

Nickels & Dimes

Medical Computer Systems has received a cash offer of $7 a share for each of its 2.7 million outstanding shares from Dun & Bradstreet. Current market price for the stock is $4.75. The firm's board of directors has not yet made a recommendation on the matter.

$ $ $

Trading in **Wyly Corp.'s** securities has been halted pending announcement of a new recapitalization plan due Aug. 20.

$ $ $

Network Data Processing has declared a 4-cent divident payable Sept. 1 to holders of record Aug. 15.

$ $ $

National CSS has declared a quarterly dividend of 10 cents a share payable Sept. 1 to holders of record Aug. 15.

How to stretch your DP dollars without getting bent out of shape.

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- Making your computer a profit center through timesharing - an applications story.
- Trade-Offs of using a service bureau versus an in-house system — a tutorial.
- Lease or purchase? — Caveats and benefits.
- Designing a computer facility — how it's built is almost as important as what's in it.
- Saving money in a universlty DP environment — a case study.
- How a municipal government and a state agency cut costs by sharing a system — an applications story.
- Saving money on computer room forms — a survey of innovative methods.

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Contracts

Alanthus Data Communications Corp. has been awarded a three-year blanket purchase order contract to lease data communication terminals to Chrysler Corp.'s Service & Parts Division, Detroit, Mich.

Logicon, Inc. has received two contracts totaling $1 million from the Naval Sea Systems Command to expand its work in support of the Navy's Aegis ship combat direction system

Keane Associates, Inc. has received a five-year contract from Newton-Wellesley Hospital in Wellesley, Mass. to provide on-site DP management services.

Conrac Corp. has been awarded a contract by IBM's Federal Systems Division for the Strategic Air Command Communication Systems replaceable keyboard displays.

Collins Commercial Telecommunications Group of Rockwell International has received a five-year contract from Securities Industry Automation Corp. (Siac) for the upgrading and expansion of Siac's Rockwell-Collins front-end/message-switching system.

Distronics Corp. has received a contract from Huron Pipe & Supply Co. to automate business operations.

The Pertec Computer Corp. Service Division has received a two-year contract from Randal Data Systems, Inc. to provide field maintenance for Randal's business computer systems.

TRW, Inc. has received a contract from Pitney-Bowes to service customers of Pitney-Bowes' Spice retail terminal systems.

Recognition Equipment, Inc. has received a $1.7 million contract from the Federal Reserve System to build five high-speed Currency Verification, Counting and Sorting systems.

Executive Corner

- Mark McGrew has been promoted to president of Computer Power Systems Corp.
- George J. Vosatka has been named president of the Valcomp Division of Tymshare, Inc.
- Emmett W. Johnson was appointed vice-president, Navy Systems Division and John W. Vold was named vice-president of the International Systems Division within the Sperry Univac Defense Systems Division.
- Jerome J. Meyer has been named vice-president and general manager of Sperry Univac Minicomputer Operations and James B. Aldrich was named vice-president of airlines operations.
- Donald P. Moffet was named chief operating officer and executive vice-president of Sycor, Inc.
- M. Kenneth Oshman and E.E. van Bronkhorst have been elected to the Xebec Systems, Inc. board of directors.
- Dr. Peter McCuen has been named president and chief operating officer of Information Terminals Corp.
- Stephen E. Sargent has been appointed president of Continental Computer Leasing Corp. and Gordon D. Tracy has been appointed vice-president.
- Norbert Steinberger has been named acting president and chief excutive officer of Compuscan, Inc. after the resignation of Robert A. Leonard, who was chairman, president and a director.
- John E. Fox has become vice-president, marketing and Robert J. Perry has become vice-president, plans and controls at Satellite Business Systems.
- Charles D. Kempton has been appointed vice-president, western sales of Wang Laboratories, Inc.
- James V. Wilson has been elected assistant vice-president of C.T. Law Technology, Inc.
- Bobby R. Cabaniss has been appointed vice-president/product marketing for the Computer Products Division of Itel Corp.'s Data Products Group.
- Karl Brdlik has become vice-president and general manager of Comtech Small Business Systems Division.
- Waldo L. Landmeier has been promoted to the new position of vice-president of engineering for Talos Systems, Inc.
- Jack C. Davis has been appointed a corporate vice-president/group executive of Harris Corp.

Earnings Reports

MANUFACTURING DATA SYSTEMS
Three Months Ended May 31

	1977	1978
Shr Ernd	$.28	$.18
Revenue	8,370,000	4,583,000
Earnings	778,000	532,000
9 Mo Shr	.56	.48
Revenue	15,841,000	11,834,000
Earnings	1,660,000	1,287,000

MICRODATA
Three Months Ended May 31

	1977	1978
Shr Ernd	$.24	$.40
Revenue	9,032,000	9,508,000
Earnings	532,000	893,000
9 Mo Shr	.55	1.01
Revenue	27,235,000	19,665,000
Earnings	1,227,000	1,894,000

NATIONAL CSS
Three Months Ended May 31

	1977	1976
Shr Ernd	$.77	$.66
Revenue	11,574,000	10,154,000
Earnings	879.00	754,000

NATIONAL DATA
Year Ended May 31

	1977	1978
Shr Ernd	$.52	$.36
Revenue	34,966,000	32,948,000
Earnings	2,340,000	1,923,00
3 Mo Shr	.15	.12
Revenue	9,340,000	6,245,000
Earnings	673,000	579,00

NATIONAL SEMICONDUCTOR
Year Ended May 31

	1977	1976
Shr Ernd	$.78	$1.44
Revenue	387,338,000	325,097,000
Earnings	10,184,000	18,953,000
3 Mo Shr	.25	.34
Revenue	98,272,000	88,188,000
Earnings	3,213,000	4,498,000

NUCLEAR DATA
Three Months Ended May 31

	1977	1978
Shr Ernd	$.56	$.31
Revenue	5,559,890	4,385,350
Tax Cred	.....	147,000
Earnings	e533,598	249,483

e-Includes $175,000 after-tax additional gain on prior year sale of product line.

SYKES DATATRONICS
Three Months Ended May 31

	1977	1878
Shr Ernd	$.13	($.01)
Revenue	1,151,994	722,071
Earnings	141,160	(10,989)

TAB PRODUCTS
Year Ended May 31

	1977	1976
Shr Ernd	$2.74	$1.40
Revenue	50,280,000	37,666,000
Earnings	2,285,000	1,168,000
3 Mo Shr	.78	.57
Revenue	13,861,000	10,933,000
Earnings	838,000	474,000

APPLIED DIGITAL DATA
Three Months Ended May 31

	1977	1978
Shr Ernd	$.22	$.28
Revenue	7,816,011	5,412,511
Earnings	1,251,372	1,054,663
6 Mo Shr	.45	.53
Revenue	13,197,255	10,412,511
Earnings	2,226,308	2,024,100

COMPUTER HORIZONS
Three Months Ended May 31

	1977	1978
Shr Ernd	$.09	$.09
Revenue	1,368,371	980,785
Earnings	50,185	52,171

COMPUTER INVESTORS GROUP
Year Ended March 31

	1977	1976
Shr Ernd	.....	$.85
Revenue	$28,635,000	33,582,000
Tax Cred	132,000	91,000
Earnings	(1,941,000)	1,955,000

TEKTRONIX
Year Ended May 28

	1977	1878
Shr Ernd	$2.49	a$1.71
Revenue	454,958,000	368,645,000
Earnings	43,971,000	30,069,000
3 Mo Shr	.60	a.49
Revenue	125,308,000	85,731,000
Earnings	14,172,000	6,687,000

a-Adjusted for two-for-one stock split in May 1977.

POSITION ANNOUNCEMENTS

SYSTEMS PROGRAMMER

The University of Idaho announces an opening for a DP Software Specialist II, to participate in the expansion of our S370/145, OS/VS1 academic and administrative computer facility. The position, with starting salary of $14,796, includes excellent fringe benefits, a college atmosphere, and easy access to Northern Idaho recreational areas. Among the minimum qualifications are a bachelor's degree in a computer-related field and one year of systems programming experience. Send your resume by September 30, 1977 to Jeff Billin, Computer Services, University of Idaho, Moscow, IO 83843. An AA/EO employer and educational institution.

PROJECT MANAGER

N. Eng. Industrial seeks indiv to direct tech. staff in MVS implementation. Excell. FORTUNE 500 client offering growth oppty. Salary to $28,000. Contact Stan Ourbas.

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

PROGRAMMER

The FIRST PEOPLE have an opening on the programming staff for an individual with 2 to 3 years in the data processing field with BAL experience and OS/VS1 exposure. Tele-processing knowledge would be advantageous.

We offer free checking, cafeteria facilities, excellent benefits and attractive starting salary.

SEND RESUME & APPLY
9 AM TO 4 PM
PERSONNEL DEPARTMENT
FIRST NATIONAL BANK
10th & Baltimore
Kansas City, Mo.
Equal Opportunity Employer

SENIOR SYSTEMS PROGRAMMER

Responsibilities will include systems programming support of OS MVT. The successful applicant will have at least 2 to 3 years experience in systems programming (OS or VS) and be familiar with the respective SYSGEN process, and a bachelors degree or equivalent combination of education and experience. A proven ability to lead others as a project manager is also highly desirable. Starting salary will be in the $16,000-$20,000 range, depending on qualifications. A full fringe-benefit package also applies, including 4 weeks of vacation.

The J. Preston Levis Regional Computer Center (JPLRCC) provides computing services for a number of users in Northwest Ohio, including Bowling Green State University, the City of Toledo, the University of Toledo, and the Toledo/Lucas County Criminal Justice Regional Planning Unit with IBM and Univac systems. RPLRCC is located south of Toledo in surburban Perrysburg in an area with a full range of cultural and recreational opportunities. Applicants should submit a complete resume, salary history and a list of references no later than September 9, 1977 to: Personnel Officer, JPLRCC, 25875 Dixie Hwy., Perrysburg, Ohio 43551. (JPLRCC is an EO/AA Employer)

PROGRAMMERS -- ANALYSTS

DASD Corporation, a national consulting firm specializing in Software Product development and Contract Services, is planning to increase its staff considerably during 1977. Positions are now open in the following areas:

- Project Management
- Project Leaders
- Senior Analysts
- Programmer/Analysts
- Programmers
- DATA BASE CONSULTANTS

We are looking for people with experience in any of the following catagories:

COBOL
ALC/BAL
RPG II
PL1
FORTRAN

IMS
TOTAL
IDMS
CICS
CFMS
DBOMP

IBM (DOS, OS, VS)
BURROUGHS
HONEYWELL
CDC

This is an excellent opportunity for the right individuals.

Benefits include Blue Cross Blue Shield Medical Ins., Life Ins., Disability Ins., Retirement Plan and an excellent salary.

We have offices in Milwaukee, Chicago, Houston, Los Angeles and Philadelphia. Expansion plans for other cities are also underway. We will relocate you to accommodate your career as well as DASD's plans.

Please call or send your resume to our Corporate Offices at:

DASD CORPORATION
8705 North Port Washington Road, Suite 301
Milwaukee, Wisconsin 53217
(414) 351-2600

COMPUTER PROFESSIONALS

M.I.S. INTERNATIONAL, INC. — an internationally-known computer systems integration organization — requires specialized professionals for top assignments in Michigan and Indiana.

Knowledge of the following computers is desirable:

- IBM/IMS Expert
- COBOL Programmers for IBM 360/370, Burroughs 4700, Honeywell 6000, Interdata
- MARK IV, Varian, Microdata Programmers
- Mini/Micro Programmers for CAI/LSI-2, ModComp, PDP-11 with RSX, TI 990-4

Computer Professionals interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully-paid fringe benefits, educational opportunities, and relocation allowances. You are invited to send your resume to Mrs. M. Roselisp

M.I.S. INTERNATIONAL, INC.
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

COMPUTER CENTER DIRECTOR

Clemson University is seeking a director for the Computer Center who is responsible for academic, administrative, and contract computing services. The director is responsible for the host computer facility (IBM 370/165-II under MVS) as well as local and remote terminal networks. The director will maintain computing facilities at a state-of-the-art level to support research and instructional needs as well as maintain maximum system availability for production support of statewide on-line systems. The director reviews and coordinates computer resource needs with two directors of application programming divisions which serve on-campus departments and off-campus agencies. He supervises managers of computer operations, software systems, hardware systems, and academic computing services. Minimum qualifications include five years experience in data processing management, design and operation of data base/data communication systems and management of teleprocessing networks. Masters degree in data processing related area required, Ph.D. preferred. Salary negotiable and commensurate with qualifications. Submit three letters of reference relevant to technical and management qualifications and complete resume to:

Search Committee, Computer Center Director, c/o Graduate School, E-106, Martin Hall, Clemson University,
Clemson, South Carolina 29631

Closing date for applications is October 31, 1977. Clemson University is an equal opportunity, affirmative action employer.

PROGRAMMER ANALYST

Corporate office of Rocky Mountain meat packer has a current opening for a programmer/analyst. We offer a challenging opportunity to an individual with a minimum of two years programming PDP 11/40 in BASIC + under RSTS/E. Degree in business or math preferred. Thorough knowledge of RSTS/E operating system, accounting systems and experience with a data base would be a plus. Send confidential resume to Personnel Dept., P.O. Box 16345, Denver, CO 80216

An Equal Opportunity Employer

BURROUGHS PROGRAMMER

The FIRST PEOPLE have an opening for an individual with 3-4 years experience in the data processing field with COBOL and Burroughs System exposure. Knowledge on IPS on medium systems is essential. Data Communications experience preferable.

We offer free checking, cafeteria facilities, excellent employee benefits and attractive salary.

SEND RESUME (with salary requirements) OR APPLY 9 AM TO 4 PM.

PERSONNEL DEPARTMENT
FIRST NATIONAL BANK
10th & Baltimore
Kansas City, MO.
Equal Opportunity Employer

SYCOR

Sycor is holding a Distributed Data Processing Systems Career Conference in San Francisco!

WESCON SHOW INTERVIEWS!
TO ARRANGE A CONVENIENT APPOINTMENT
CALL TOLL FREE: 1-800-521-3176

SYCOR, Incorporated, a leader in the manufacture of distributed data processing systems, is currently seeking qualified:

SENIOR ELECTRONICS ENGINEER

BSEE with minimum 4 to 6 years' experience or equivalent in development of hardware systems using micro computers on discrete controllers. Experience in areas such as disc controllers or other mass storage system controllers is preferable.

SENIOR DESIGN ENGINEER - FIRMWARE

BSEE or BS in Computer Science with 2 to 3 years' experience in software development of real time mini-micro computer systems. Experience with I/Q drivers for devices such as cassettes, magnetic tapes, floppy disks or disks is preferable.

FIRMWARE ENGINEER - DIAGNOSTICS

Minimum 2 years' experience in hardware design, programming in assembly language of micro computers. Diagnostics programming a definite plus. BSEE or equivalent desired.

SENIOR ENGINEER - ANALOG

BSEE a must, MSEE desirable. Five years' experience in analog circuit design, preferably in magnetic recording and/or servo mechanisms.

SENIOR MECHANICAL ENGINEER

A BSME is required, MSME highly desirable, plus at least 7 years' experience in the design of products involving small, high reliability mechanisms, preferably in the printer field or related to computer peripherals. Your background should include leadership responsibility on development projects.

INDUSTRIAL ENGINEER

Minimum 2 years' experience with printed circuit board assembly methods a must, electro-mechanical assembly experience a definite plus; should be experienced in processing and standards. A degree in E.E. or equivalent experience is needed.

SYSTEMS PROGRAMMERS

Minimum two years' experience as a Systems Programmer in any of the following areas:

- ● Data Communications ● Compiler and Languages ● Access Methods
- ● Data Base Management Systems

Experience in mini/micro computers with Assembler language is desired. BS in Computer Science or equivalent is a must. MS is preferred.

SYSTEMS ENGINEER

Experience as a Programmer in COBOL or Assembler required. Micro/Mini and/or programmable (intelligent) terminal use or support experience desirable, plus exposure to data entry applications and marketing customer support. Communications with bi-sync and on-line background especially helpful. Bachelor's degree desired.

SALES REPRESENTATIVE

Minimum of 3 years' experience successfully selling terminals, peripherals, or small systems and general knowledge of DP applications, including communications is required. Candidates must have a proven track record of sales performance over quote. Responsibilities include sales of a complete line of computer products and support of existing customers.

If unable to see us during the WESCON show interviews, please send your resume in confidence to:

SYCOR, INC.
Gopi R. Jindal, Ph. D., Manager Corporate Employment & Staffing
100 Phoenix Drive Ann Arbor, Michigan 48104
(313) 995-1156

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SYCOR

SYSTEMS PROGRAMMER

WE ARE OS/VS 1 (DB-DC)
TONE INSTALLATION.
RELOCATION AND EXCELLENT BENEFITS
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INFORMATION SYSTEMS DEPT.
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Glendale, CA. 91201
(213) 240-6400

BEKINS
The Bekins Company
Glendale, California
EOE

PROGRAMMER ANALYST

wanted to develop new applications programs for administrative offices at South Dakota School of Mines and Technology, Rapid City, South Dakota using a CDC 6400 operating under KRONOS 2.1. This position is available under South Dakota's Career Services. Contact Director, Computation Center, South Dakota School of Mines & Technology (605) 394-2215. Closing date is September 19, 1977. SDSM&T is an equal opportunity employer.

FEE PAID LOCATIONS

near
Philadelphia, Chicago, Milwaukee
$13,000 to $22,000

Needed programmers, Programmer Analysts, Systems Analysts, Software Analysts.

If you have one of the following qualifications, minimum 2 years, COBOL or FORTRAN or ALC on 360/370 OS or DOS, please

Call or send resume
DATA PROCESSING DEPT.
PERSONNEL PLACEMENT
537 Huffman Mill Rd.
Burlington, N.C. 27215
(919) 584-5591

PROGRAMMER ANALYST
SYSTEMS ANALYST

Outstanding opportunity to join our progressive organization. These positions are available at the home office of BLUE CROSS BLUE SHIELD, near beautiful Chapel Hill, N.C. The successful candidates will have two to five years experience; exposure to on-line systems in an IMS data base environment a plus. We offer an excellent salary and benefit package. If you are interested in a career opportunity offering growth and a professional environment, please submit your resume to:

Personnel Mgr.
BC/BS of N.C.
P.O. Box 2291
Durham, N.C. 27702

Equal Opportunity Employer

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computer hardware and software candidates...
RELAX

We have sources of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

AVAILABILITY, INC.
Data Services Consultants
5401 W. Kennedy Blvd., Suite 285
Tampa, Florida 33609
(813) 872-2631

COMPUTER CAREERS INC.
Specialists-Data Processing
4720 Montgomery Lane
Suite 503
Bethesda, MD. 20014
(301) 654-9225

WETERRINGS & AGNEW, INC.
425 Midtown Tower
Rochester, N.Y. 14604
(716) 454-3888

CAREER SPECIALISTS PERSONNEL SERVICES
4600 El Camino Real, Suite 206
Los Altos, Calif. 94022
(415) 941-3200

DEALY-ROURKE PERSONNEL SERVICE
1808 West End Building
Suite 121
Nashville, Tennessee 37203
(615) 329-1771

National Personnel Associates®

ASSISTANT TO THE DIRECTOR POLICY & PLANNING

The Berkeley campus of the University of California invites applications for this new position. As the principal assistant to the Director - Computing Affairs, this position aids in formulating campus computing policy and formal plans, and in administering major information systems, instruction, and research computing activities. Develops and administers departmental budgetary and financial control systems. Applicants must have 8 years computing experience, including 3 years management, or staff to senior management, 2 years budgetary or accounting responsibility, policy and planning, and other broad computing experience. University experience most desirable. Salary range $23,500-$33,100. Apply by September 15 to:

Director, Computing Affairs
Box CA13-C
University of California
Berkeley, CA 94720
An Affirmative Action Employer

PROGRAMMER ANALYSTS
Electronic Commercial Business Systems

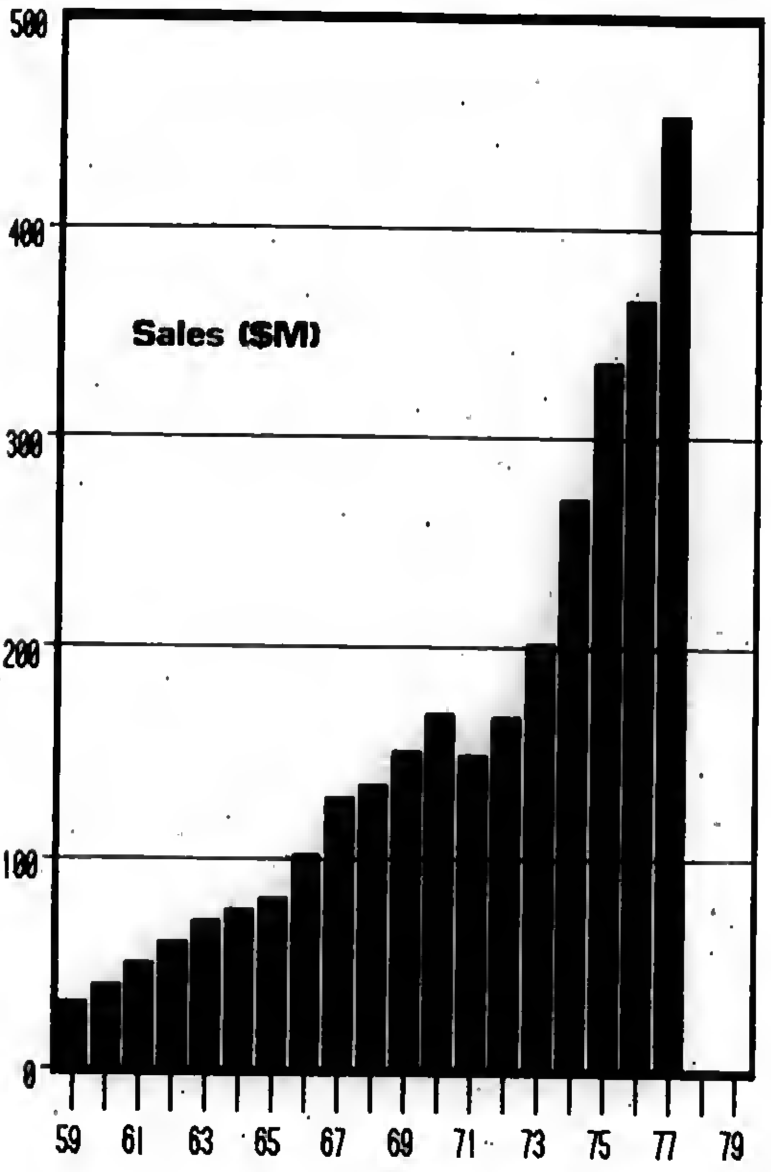
The expanding parameters of UOP, Inc., resulting directly from a solid commitment to diversification and innovative efforts in research and development, has opened exciting career opportunities for Programmer Analysts at the world headquarters located in the northwest suburbs of Chicago.

B.S. degree coupled with two to four years systems analysis and programming experience that includes: ANS and COBOL; a thorough knowledge of the use, application and operation of computer systems and the principles of system documentation and programming; and a good familiarity with accounting and statistical theories and methods. Working within the framework of a progressive IBM 370/158 environment, selected candidates will be involved in a challenging range of assignments in the design, programming, testing and installation of commercial business systems.

Excellent salary, full benefits and generous growth potential. For confidential consideration, send resume which must include salary requirements to:

Barbara Gardner
UOP, INC.
Ten UOP Plaza
Des Plaines, Illinois 60016
An Equal Opportunity Employer M/F

We're Growing, So Can You



Marketing Product Managers

This continued corporate growth has created openings for product managers to market computer terminals and associated graphic products. Responsibilities include product planning, market introduction and penetration, administration of product programs and planning all aspects of product support.

Strong marketing and/or sales background in computing with emphasis on terminals and graphics is needed. Experience in hardware/software systems is desirable. Knowledge of the time sharing environment is a plus. Formal education might include a BSEE/CS and MBA in marketing.

Marketing Product Specialists

These individuals work directly with our customers and sales engineering providing technical support and applications assistance as well as participating in product planning and market development.

Your background in design or application of these products and experience in mini/micro computers, computer peripherals, graphics, time-sharing systems, ASSEMBLY and/or high level programming is desirable. Formal education might include a BSEE/CS and marketing courses.

Salary is open. Benefits include educational support, insurance and profit sharing programs. Tektronix, Inc., develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation.

Send detailed resume and salary history to Roy Epperson, TEKTRONIX, INC., P.O. Box 500, C38, Beaverton, OR 97077.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

DATA PROCESSING PROFESSIONALS

Federated Department Stores, a national leader in retailing, is currently in the midst of a major systems development program utilizing the most advanced systems techniques and software available in today's market. The end result will be one of the most highly sophisticated data processing shops in the nation. The program is in full swing and growing rapidly, with many ground floor opportunities still available in a variety of areas.

Programmer Analysts

Qualified individuals will have at least two years of COBOL programming experience (any type of hardware) along with system design ability. Any familiarity with IMS, TSO, or structured programming techniques would be a definite plus.

System Analysts

Qualified individuals will be "take charge" type of people with at least four years of systems design and programming experiance. Special consideration will be given to those applicants familiar with Retail applications as well as those familiar with general accounting systems.

Data Base Analysts

Qualified individuals will have at least three years of systems and programming experience with at least one year of experience designing, programming and implementing systems under IMS. COBOL expertise would be helpful as well as an understanding of IMS internals.

These positions offer excellent starting salaries, a liberal benefits package, and a challenging opportunity to play a key role in a multi-divisional systems development effort.

Interested? Then send us your resume or other experience summary today!

Mr. Frank McKain
Systems Research & Development, Room C-829
Federated Department Stores, Inc.
222 W. 7th St. Cincinnati, Ohio 45202

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PROGRAMMERS PROGRAMMER/ ANALYSTS

Let us offer you our professional expertise in finding the "right" position and company. Our individualized search will provide you with local and national exposure depending on your geographical preference. If you have at least 2 years experience in programming, send your updated resume, geographical preference, and salary requirements in strictest confidence to:

SEARCH E.D.P., INC.
Suite 25
3181 Linwood Rd.
Cincinnati, Ohio 45208

COMPUTER PRO

If you are a professional and have the "state of the art" data skill, we want to talk to you. The market is right, all we need is you! Below is a sample of some of the positions available.

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Chicago Asst Mgr.	25-28K
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(312) 325-7660
INFONAMICS INC.
15 Spinning Wheel Rd.
Suite 228, Hinsdale, IL 60521

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consider these unique software opportunities at EAI

EAI is a world leader in the design and manufacture of computation and simulation equipment. Our continued desire for increased capability and sophistication in all related areas has created these challenging software opportunities for,

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INDUSTRIAL SYSTEMS – Will specify, design and implement industrial real time data acquisition/analysis systems software for Laboratory and Power Plant monitoring systems, and act as technical support to field personnel.

HYBRID SYSTEMS – To design hybrid software for 16- and 32-bit digital computers and power systems simulator software for hybrid-based systems.

SYSTEMS ANALYSTS

COMPILER DESIGN – Working with senior Compiler Designers, will design software tasks to be programmed, debugged and integrated into a hybrid compiler: will also be involved in system installation and education of customer personnel.

CUSTOMER SUPPORT – Will interface with customers in the analysis and resolution of system software problems, and coordinate quality assurance activities relating to system software and design support for internal and customer projects.

PROGRAMMER ANALYST

To develop and implement data reduction algorithms on a hybrid computer system, initially, will analyze, improve, document and direct production use of an existing program which collects and presents logged test data.

All the above positions require a B.S. in an Engineering discipline and/or Computer Science or Math; a knowledge of FORTRAN and/or ASSEMBLER languages; experience in related areas, and, most importantly, a high degree of professional commitment.

Compensation includes salary commensurate with experience, comprehensive benefits, and paid relocation to the Jersey Shore. For immediate consideration, forward your resume to Barbara Evenson, Corporate Staffing, or call her collect at (201) 229-1100.

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EAI Electronic Associates, Inc.

San Diego opportunity in advanced-technology

EDP SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Special Systems Division needs your help now in developing advanced, high-technology EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice—beach, valley, mountain, country, small-town or urban—and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too—from mild coast to dry desert. San Diego is a place of extraordinary choices—and right now the choice is yours.

SENIOR SOFTWARE SPECIALISTS

For development of a very large distributive processing system, involving advanced, state-of-the-art technology. Activity will utilize the entire spectrum of EDP equipment, from minis to large mainframe, and a wide assortment of peripherals, terminals and associated devices. Minimum of 5 years' experience required in development of systems software, with heavy emphasis in telecommunications, networks and file processing, plus background in operating systems, expertise in assembly languages or COBOL, and preferably a related degree.

DISTRIBUTIVE PROCESSING SYSTEM DEVELOPMENT

Positions are available in the development of a very large distributive processing system, advancing the state-of-the-art technology utilizing the spectrum of EDP equipment—minis to large mainframe with assorted peripherals and terminal devices. Experience in telecommunications, networks, file processing or operating systems plus expertise in COBOL.

Our benefit package is what you would expect from a major blue chip corporation. What you might *not* expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me,

Thom Harris, Employment Specialist

NCR
SPECIAL SYSTEMS DIVISION
4046 Sorrento Valley Blvd.
San Diego, Calif. 92121
We are an equal opportunity employer

Proud, Confident, Systems Analyst

Major New England based retailer is searching for a Systems Analyst. Not just any analyst, but one who is justifiably proud of his/her record of accomplishments in the planning, design and installation of Quality Application Systems for the support of large scale retailing functions.

A person with enough confidence in his own ability to welcome the challenge of distributed processing, data base, teleprocessing, structured design and sophisticated applications.

A person with enough pride to demand excellence of himself than just mediocrity.

A professional.

If you feel you might be this person, please send resume, including salary history to:

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MS. JAN HAHN
PERSONNEL DEPARTMENT
ZAYRE
Framingham, Massachusetts 01701

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PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications ● Software development and systems programming ● Telecommunications ● Control systems ● Computer engineering ● Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

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Cherry Hill, New Jersey 08002
(609) 667-4486

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1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

PRODUCT MARKETING PROFESSIONALS
For
Advanced Dispersed Processing Systems

Make Your Future with the Leader

Datapoint Corporation has openings at its home office in San Antonio for product marketing analyst professionals to work with our advanced dispersed processing systems. Duties will span a wide range of responsibilities including competitive product analysis and providing marketing inputs on the design of new Datapoint products and the improvement of existing products.

Applicants should have three to five years of commercial programming experience with a background in operating systems, minicomputer time sharing and/or communications. Prior associations with a computer manufacturer as well as in end user operations would be a plus. Candidates should have good analytical skills on hardware/software developments, and the ability to articulate findings orally and in writing.

These positions offer the opportunity to fill a key role with Datapoint Corporation, one of the fastest growing companies in the computer industry. Successful candidates will receive excellent salaries and benefits, opportunity for rapid advancement and the challenge of a fast moving work environment. And San Antonio offers outstanding scope for quality living in a Sun Belt setting.

For more information, send resume with salary history to **Mr. Chuck Zalany, Manager of Employee Relations, Dept. CW, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

An Affirmative Action Employer Committed to Equal Opportunity

DATAPOINT CORPORATION

The leader in dispersed data processing™

BRANCH MARKETING MANAGERS & MARKETING REPS

Large multinational manufacturer currently in search of BMMs and Marketing Reps for End-User and hi tech OEM minicomputer sales. Qualified reps must have 3-5 years successful mini sales experience; managers must have 3-5 years sales management with a mini manufacturer. Packages range from 25K+ to 42k+. Excellent growth and benefits. For further information reply in confidence to: B. Verity, Account Executive

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19 Congress Street
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(617) 723-8130

EDP Mgr Prog Analyst

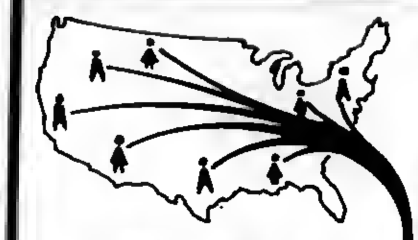
Mature, self-reliant individual to function as EDP manager and programmer/analyst for a NY based Univac installation.

The firm is a small but extremely progressive installation involved with international travel business. The position involves analysis, programming, maintenance and management of on-line reservation system using tele-processing to service four other locations. Direct computer communication to the European computer service also necessary.

Primary language is BAL but familiarity with Cobol, computer internal, and tele-processing is a must. Individual must be able to communicate effectively with the organization user community as well as be a competent technician.

For employment interview please call (212) 268-4711 and ask for Mrs. Friedman.

COMPU SEARCH...



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Since 1968, CompuSearch has sought out exceptional individuals with data processing related skills for large and small companies throughout the United States. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in learning about situations that will best meet your goals, contact our office nearest you in complete confidence. We keep a close watch for the best available opportunities locally and nationally.

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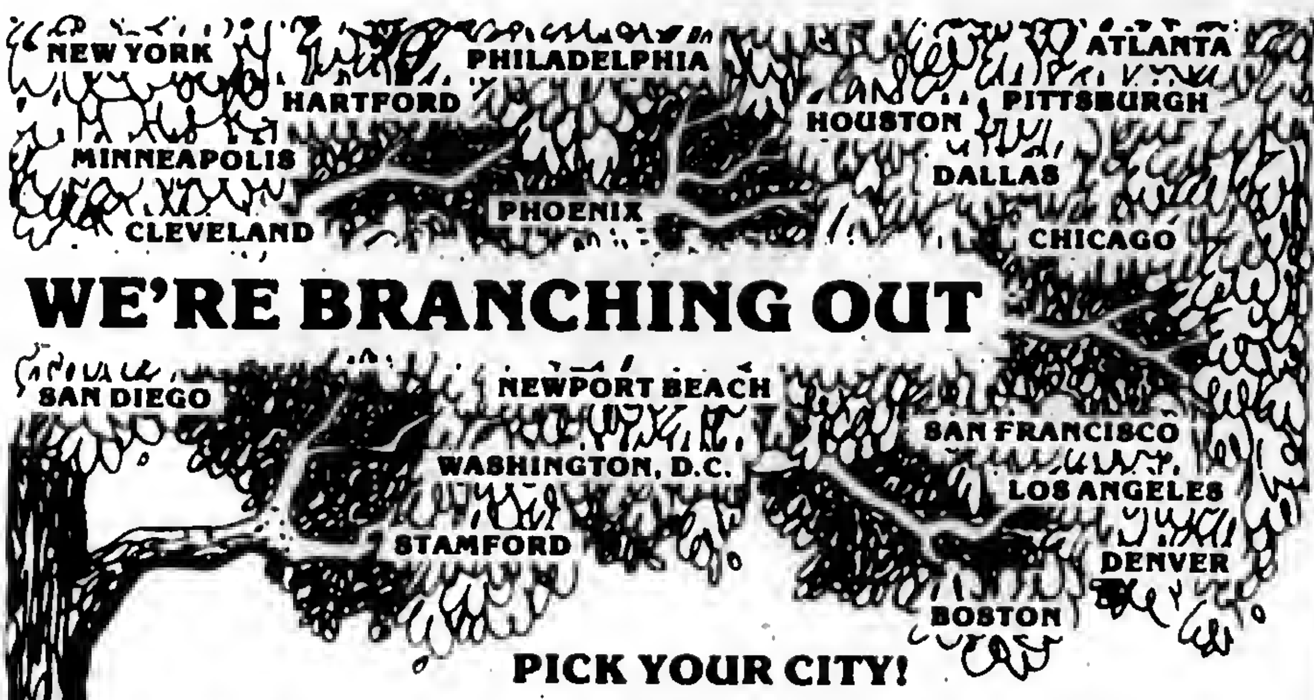

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PERSONNEL DEPARTMENT
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This is a two year contract to transfer and integrate an incident tracking system with an existing CAO system and develop additional on-line and batch application programs. One programmer will be provided for assistance. Equipment used will be a POP 11/60 mini-computer with POP 11/40 backup.

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Knowledge of software for message switching, computer-aided dispatch and/or incident tracking systems.

NECESSARY SPECIAL QUALIFICATIONS:
Must be available to begin work no later than October 1, 1977.

Submit Resumas To:
Pierce County
Personnel Department
Room B-44
County-City Building
Tacoma, WA 98402
(206) 593-4460
Closing Data:
August 31, 1977-4:30 P.M.
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Experience in assembler and/or COBOL language is essential. Candidates with on-line real-time experience in a banking or savings and loan environment are of particular interest. Send your resume and salary history to:

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Send resumes with current salary to Harold Crane, Personnel Manager, SWORCC, 3333 Vine St.,Cincinnati, Ohio 45220. Phone (513) 475-2135

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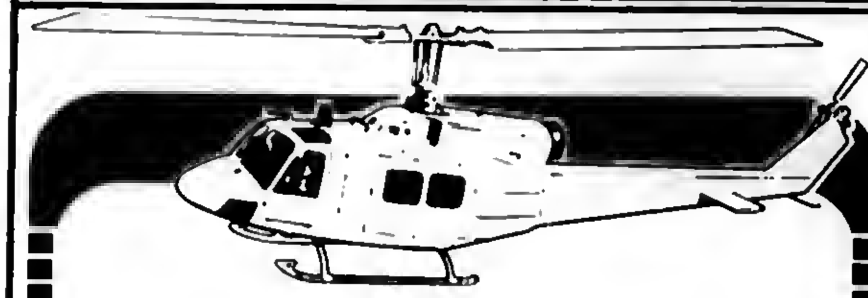

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Chief, Recruiting & Training Division
International Monetary Fund
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Programmers

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Exciting career opportunity for someone with solid design experience to take the lead in developing MIC's new management information systems.

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Send resume and salary history to **Geri Rheaume.**

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Send resume in confidence with salary requirement to:

ROBERT E. DYAR, Dept. CW829
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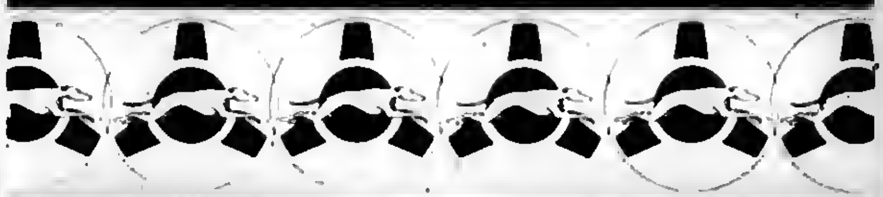

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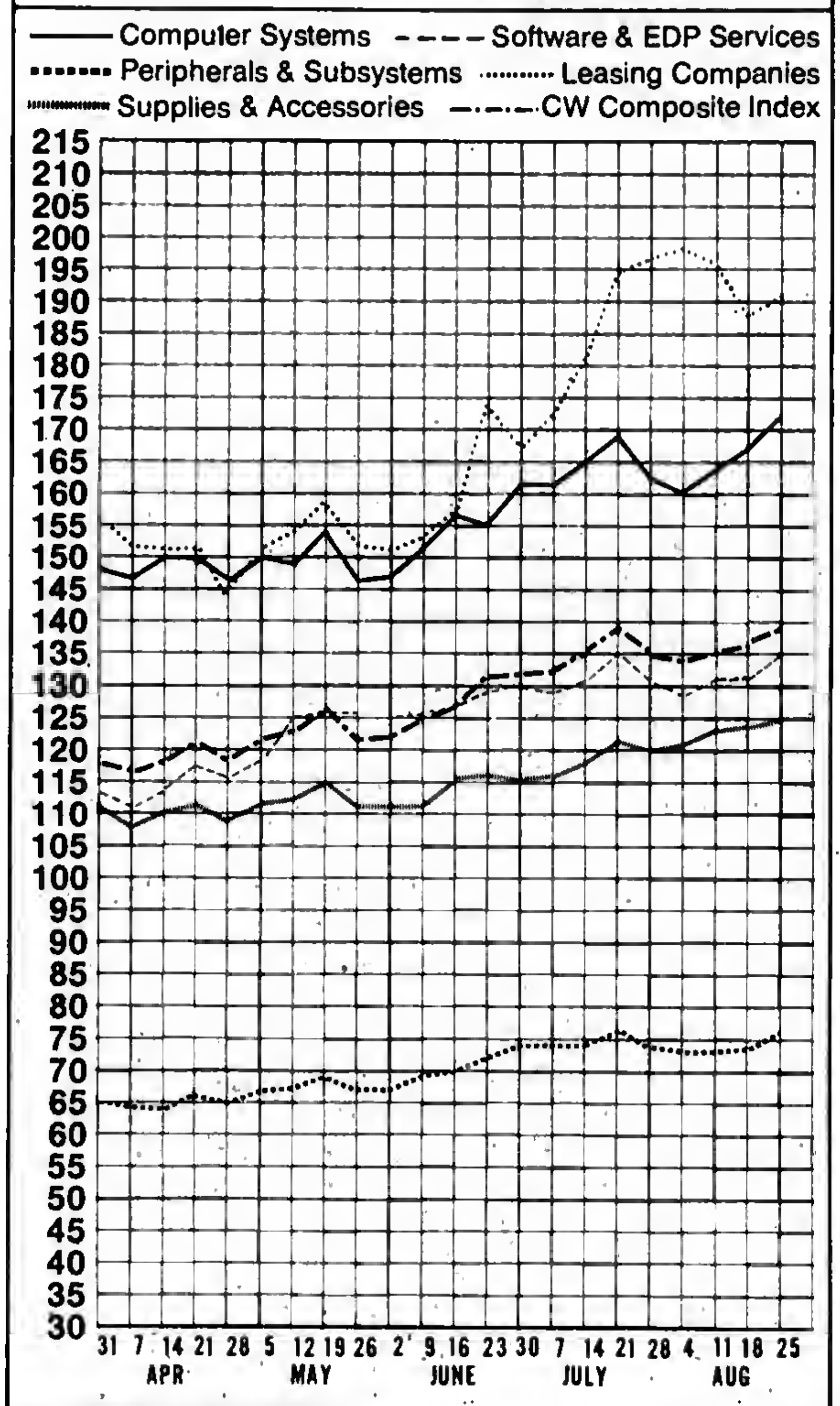

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Tex Cred	213,750	.....
Earnings	1,158,781	15,366

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	1977	1878
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Revenue	8,522,000	9,093,000
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Earnings	282,000	29,000
8 Mo Shr	.14	.....
Revenue	18,413,000	18,821,000
Tsx Cred	240,000	.....
Earnings	517,000	(592,000)

GRI
Three Months Ended Mey 14

	1977	1978
Revenue	$11,060,000	$18,802,000
Loss	132,000	78,000
8 Mo Rev	19,170,000	27,145,000
Loss	488,000	57,000

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Three Months Ended Mey 29

	1877	1978
Shr Ernd	$.58	.....
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	1977	1978
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 24, 1977

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	43 1/2	+6 1/4	+16.T
N	BURROUGHS CORP	55- 51	70 5/P	-1 1/8	-1.5
C	COMPUTER AUTOMATION	18- 30	27 7/8	-1 3/4	-5.9
N	CONTROL DATA CORP	20- 26	20 3/4	- 1/8	-0.5
N	DATA GENERAL CORP	35- 51	49	- 1/4	-0.5
N	DATAPOINT CORP	18- 30	28 5/8	- 3/4	-2.5
N	DIGITAL EQUIPMENT	37- 53	48 1/P	-1 3/8	-2.7
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	9 1/2	+ 7/8	+10.1
O	FOUR-PHASE SYSTENS	13- 18	17 3/8	+1 3/4	+11.1
N	FOXBORO	42- 54	48 1/2	+1	+2.1
O	GENERAL AUTOMATION	6- 9	7 1/4	+ 3/8	+5.4
C	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARO CO	69- 8T	78 3/4	-5 1/4	-6.2
N	HONEYWELL INC	44- 55	49 3/4	-1 3/4	-3.3
N	IBM	245-286	268	- 3/4	-0.2
O	MANAGEMENT ASSIST	5- 9	6 1/2	- 7/8	-11.8
C	MEMOREX	23- 33	33 3/R	+4 3/8	+15.0
O	MICROOATA CORP	7- 18	11 7/8	+1 1/8	+10.4
O	MODULAR COMPUTER SYS	5- 8	8	+1	+14.2
N	NCR	32- 47	44 7/8	-1	-2.1
O	PRIME COMPUTER INC	12- 20	19 1/2	+1 1/2	+8.3
N	PERKIN-ELMER	17- 22	20 1/8	- 3/4	-3.5
N	RAYTHEON CO	16- 33	28 1/4	0	0.0
N	SPERRY RAND	34- 42	36 5/8	- 1/8	-0.3
C	SYCOR INC	8- 15	10 1/4	+ 1/2	+5.1
A	SYSTEMS ENG. LABS	5- 8	7 1/4	+ 5/8	+9.4
N	VARIAN ASSOCIATES	15- 21	18 1/8	+ T/8	+5.0
A	WANG LABS.	10- 21	14 1/4	+1 3/4	+14.0

LEASING CONPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	11	+ 3/8	+3.5
O	COMDISCO INC	10- 13	11	0	0.0
A	CONNERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	CONPUTER INVSTRS GRP	1- 2	3/4	0	0.0
M	OATRONIC RENTAL	1- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2 1/8	+ 1/8	+6.2
N	OPF INC	6- 9	T T/8	0	0.0
N	ITEL	13- 21	20 7/8	+1 7/8	+9.8
N	LEASCO CORP	19- 27	25 3/8	+1 1/8	+4.6
O	LEASPAC CORP	1- 2	1	0	0.0
C	NRG INC.	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 15	14 1/8	+ 1/8	+0.8

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SOFTWARE & EOP SERVICES

	PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
AOVANCEO COMP TECH	1- 2	T/8	0	0.0
ANACONP INC	7- 10	8 T/8	- 1/2	-5.3
APPLIEU OATA PES.	5- 10	8 3/4	+1 1/8	+14.T
AUTOMATIC DATA PROC	23- 30	28 1/4	-2 1/8	-6.9
COLENAN AMERICAN COS	2- 2	2	0	0.0
COMPU-SERV NETWORK	10- 15	12	0	0.0
COMP ELECTION SYSTNS	6- 10	9 5/8	+ 1/4	+2.6
CONPUTER HORIZONS	1- 1	1 1/4	0	0.0
COMPUTER NETWORK	6- 10	9	+ 1/8	+1.4
COMPUTER SCIENCES	T- 9	8 3/4	+ 3/8	+4.4
COMPUTER TASK GROUP	1- 2	2	+ 1/4	+14.2
COMPUTER USAGE	1- 3	1 1/2	0	0.0
CONSHARE	5- T	6	0	0.0
OATA DIMENSIONS INC	3- 5	3 3/8	+ 1/4	+8.0
OATATAB	1- 2	1 3/4	0	0.0
ELECTRONIC OATA SYS.	16- 20	17 5/8	- 3/8	-2.0
INSYTE CORP	2- 3	1 5/8	- 1/8	-7.1
IPS CONPUTER MARKET.	1- 2	1 1/2	0	0.0
KEANE ASSOCIATES	3- 4	3 3/4	0	0.0
KEYDATA CORP	2- 3	1 5/8	0	0.0
LOGICON	7- 17	13 1/4	+ 3/4	+6.0
MANAGEMENT OATA	1- 2	1 5/8	- 1/8	-T.1
NATIONAL CSS INC	19- 26	25 1/4	+1	+4.1
NATIONAL OATA CORP	4- T	5 1/2	- 1/8	-2.2
ON LINE SYSTEMS INC	1T- 22	18 1/4	+1 1/4	+7.3
PLANNING RESEARCH	3- 6	5	+ 1/8	+2.5
PROGRANMING & SYS	1- 1	1/2	0	0.0
RAPIGATA INC	2- 3	2 3/4	0	0.0
REYNOLOS & REYNOLC	1T- 20	18 1/4	+ 1/4	+1.3
SCIENTIFIC COMPUTERS	1- 3	3 5/8	+ 1/2	+16.0
TYMSHARE INC	14- 23	21 T/8	+ T/8	+4.1
URS SYSTEMS	4- 5	4 1/4	- 1/8	-2.8
WYLY CORP	1- 2	1 1/4	0	0.0

PERIPHERALS & SUBSYSTEMS

	PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
ADDRESSOGRAPH-MULT	10- 15	13 T/R	+ 7/8	+6.7
AOVANCEC MEMORY SYS	7- 9	7 1/2	- 1/8	-1.6
AMPEX CORP	8- 11	10 1/8	- 1/4	-2.4
ANDERSON JACOBSON	3- 5	4	+ 1/8	+3.2
APPLIED OIG DATA SYS	10- 20	19 1/8	+2	+11.6
BEEHIVE INT'L	8- 12	9 7/8	+ 3/8	+3.9
BOLT,BERANEK & NEW	7- 8	7 3/8	- 5/8	-7.8
BUNKER-RAMO	8- 12	11 1/4	- 3/6	-3.2
CALCOMP	3- 5	2 7/8	- 1/8	-4.1
CAMBRIOGE MEMORIES	1- 3	2 3/8	+	+2.6
CENTRONICS DATA COMP	22- 30	28 7/8	- 3/8	-1.2
COGNITRONICS	1- 1	5/8	+ 1/R	+25.0
CONPUTER COMMUN.	5- 6	6 1/2	- 1/8	-1.8
COMPUTER CONSOLES	4- 7	4 1/4	0	0.0
COMPUTER EQUIPMENT	2- 3	3 1/8	+ 1/4	+8.6
COMPUTER TRANSCEIVER	1- 1	1 1/4	+ 1/6	+11.1
CONTCN	9- 13	10 1/R	+ 1/4	+2.5
CONRAC CORP	19- 28	22	- 1/2	-2.2

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	OATA 100	6- 9	T 1/2	- 1/4	-3.2
A	DATA PRODUCTS CORP	9- 16	14 5/8	0	0.0
O	OATA TECHNOLOGY	3- 4	4 1/4	+ 1/4	+6.2
O	DATUM INC	1- 2	1 1/2	- 1/4	-14.2
O	OECISION DATA COMPUT	2- 3	2 1/4	+ 1/8	+5.8
O	OELTA OATA SYSTENS	1- 1	3/8	+ 1/8	+50.0
N	ELECTRONIC M & M	4- 5	4 1/8	+ 1/8	+3.1
O	FABRI-TEK	1- 2	1 1/8	+ 1/8	+12.5
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	8 3/4	0	0.0
N	HARRIS CORP	28- 39	35 3/4	+ T/8	+2.5
A	INCOTERN CORP	10- 15	11 3/8	+ T/8	+8.3
O	INFOREX INC	4- 7	4 1/2	- 1/4	-5.2
O	INFORMATION INTL INC	9- 14	10 1/4	+ 1/4	+2.5
O	INTEL CORP	38- 57	46 1/2	-3 1/2	-7.0
A	LUNDY ELECTRONICS	3- 6	4 3/8	+ 1/8	+2.9
C	MSI OATA CORP	6- 12	10 3/4	- 5/8	-5.4
N	MOHAWK OATA SCI	5- 8	6 1/2	+ 1/2	+8.3
O	PENRIL CORP	2- 5	3 3/4	0	0.0
A	PERTEC CORP	T- 9	8	- 1/8	-1.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST..	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 3/4	- 1/8	-3.2
O	RECOGNITION EQUIP	6- 10	7 1/2	- 1/2	-6.2
O	SCAN OATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 16	15 1/2	- 1/4	-1.5
O	T BAR INC	7- 12	11 3/4	- 1/4	-2.0
O	TALLY CORP.	4- 6	4 7/8	+1	+25.8
A	TEC INC	7- 10	8	+ 3/4	+10.3
N	TEKTRONIX INC	29- 3R	37	+ 1/2	+1.3
N	TELEX	2- 3	2 5/8	0	0.0
O	WILTEK INC	1- 1	3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 24 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 T/R	0	0.0
A	BARRY WRIGHT	10- 14	14 1/4	+ 3/4	+5.5
O	CYBERMATICS INC	1- 1	1 1/4	+ 1/8	+11.1
O	DUPLEX PRODUCTS INC	14- 19	1T 1/2	+ 1/8	+0.T
N	ENNIS BUS. FORMS	6- 7	6	- 1/8	-2.0
O	GRAHAM MAGNETICS	11- 16	16 1/4	- 1/8	-0.7
O	GRAPHIC CONTROLS	15- 18	16	0	0.0
N	3M COMPANY	48- 56	51 1/2	+ 3/8	+0.7
C	MOORE CORP LTD	26- 37	2T 1/2	+ 3/4	+2.8
N	NASHUA CORP	16- 26	25 1/2	+1	+4.0
O	STANDARD REGISTER	18- 25	21 1/2	0	0.0
O	TAB PRODUCTS CO	13- 19	17 1/4	- 1/4	-1.4
N	UARCO	19- 22	19 3/8	-1 1/8	-5.4
A	WABASH MAGNETICS	10- 15	12 1/8	- 3/8	-3.0
N	WALLACE BUS FORMS	17- 21	18 3/8	- 1/8	-0.6

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NEWSPAPER

There's a computer on board this spacecraft — and it's doing just what it wants to do.

System On Board Voyager Takes Its Cue From '2001'

By Ann Dooley
CW Staff

PASADENA, Calif. — Much like HAL — the computer in the film "2001, A Space Odyssey" — the National Aeronautics and Space Administration's (Nasa) computer on board the Voyager II unmanned spacecraft decided it knew better than its human operators.

Last week the computer took over control of the ship headed for Jupiter and beyond and refused orders from scientists at ground control. It did not respond to human command because it was "trying to protect itself" from a "rough ride," a spokesman explained.

The problem occurred when the Voyager II did not follow directions from the command center and failed to order a maneuver to check the position of a science boom on board the craft, the spokesman said. Instead, the computer cancelled the maneuver and returned the craft to its previous status.

The command was to have removed the dust cover from instruments at the end of the boom and at the same time to have spun the craft on its axis, the spokesman said.

The computer's failure to maneuver caused all activity to terminate while it waited for further information from the ground.

It took scientists back on Earth

(Continued on Page 4)

Calcomp Asks Directed Verdict Be Thrown Out

By Molly Upton
CW Staff

SAN FRANCISCO — California Computer Products, Inc. has filed an appeal asking the Ninth Circuit Court of Appeals here to reverse the directed verdict in its antitrust case against IBM and grant a new trial.

The Justice Department filed an amicus curiae, or "friend of the court," brief asking that at the very least Judge Ray McNichols, who directed that verdict, be ordered to indicate his reasons for doing so.

Regardless of whether he issues an opinion, however, McNichols' judg-

(Continued on Page 6)

Nations to Debate Conflicts In Transborder Data Flow

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Are European governments using the privacy issue to drive U.S. companies out of the international data base and telecommunications markets?

This issue and a host of others concerned with transborder data flow will be the subject of an international meeting in Vienna, Austria, from Sept. 20-23 sponsored by the Organization for Economic Cooperation and Development (OECD).

As many as six European nations have passed or are considering laws ostensibly to protect the confidentiality of data about their citizens which companies operating within their borders are sending to other nations to process.

These nations fear that growth of information technology outside their borders poses a threat to their national sovereignty. A country whose data files are located in other nations is more vulnerable in times of peace as well as war, according to G. Russell Pipe, a consultant to OECD's Computer and Privacy Studies unit.

Like Canada, European nations also fear technology within their own borders will be retarded if they routinely send data abroad for more sophisticated processing, Pipe said. (See related story on Page 9).

With the marriage of computer and communications technology, the U.S. has become the acknowledged leader and is rapidly becoming the "backbone of all industrial activity in the Western world," Pipe said.

(Continued on Page 4)

Document Reveals Bell Plans Packet Network

By Ronald A. Frank
CW Staff

NEW YORK — AT&T's upcoming answer to public packet networks will be a nationwide network handling "various protocols."

Slated to be called the Bell Data Network (BDN), the offering will include communications processing services and network management capabilities, according to preliminary specifications obtained from an industry source.

Announcement of a network that would allow the Bell System to compete with the public packet networks emerging around the world has been expected for some time. The AT&T network would compete with the packet network operated by Telenet Communications Corp. in this country.

Communications services to be provided by the BDN include "communications processing functions" such as data entry, inquiry/response, remote job entry and message distribution, according to the AT&T specifications. These functions can be customized by BDN customers using a high-level programming language called Feature Definition Language (FDL), according to the AT&T document, dated November 1976 and called a "Service Offering Statement."

Processing in Nodes

Implementation of the processing functions will be "provided for" in storage areas of the BDN nodes. Each node will include general-purpose storage for data accumulation and a "communications processor" to execute a user's FDL instruction set, according to the Bell document.

The BDN will include as an integral part of its structure "many of the communications-oriented functions now being performed by the customer's on-premise hardware and software."

The AT&T specifications for the BDN do not use the term "packet switching," but they do state that the unit of volume selected for transmission is the "kilopacket," which was described as 1,000 packets each containing 100 characters. The Service Offering Statement did not list proposed rates for BDN services.

The BDN will connect terminals to terminals; terminals to hosts; or hosts to hosts on a 24-hour, seven day per week basis. Two service grades will be provided for data transmission — standard grade and priority grade.

Each grade of service has several "delivery options." Once a user selects the grade of service desired, billing is computed on the basis of transmission volume "without regard to the amount of time for transmission or to the distance traversed," according to the BDN document.

Within the priority service designa-

(Continued on Page 2)

Firm Charged With Using Program to Inflate Stock

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C.— Fisco, Inc., a Philadelphia-based auto insurance company, used a computer program to inflate its profits apparently to increase the value of its stock, according to a complaint filed here recently by the Securities and Exchange Commission (SEC).

In one day alone, the program — called "clean" — canceled out almost $1 million in claims against the company, thereby allowing it to report higher earnings, the complaint charged.

Named along with the company in the charges was the firm's former vice-president for DP, Richard C. Mitchell, and five other former officials of the company.

Fisco, which has been "essentially bankrupt" since the fraud was discovered when its books for 1973 were audited, and the six officers agreed to permanent injunctions enjoining them from violations of the antifraud and reporting provisions of the security laws on the same day the complaint was filed.

The "clean" program was essentially very simple, according to SEC investigators.

In the normal course of events, an insurance company sets up certain re-

(Continued on Page 3)

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Document Reveals AT&T Plans Network Offering Data Entry, Inquiry/Response

(Continued from Page 1)

tion, three levels can be selected. Priority 1 assures end-to-end transmission in a maximum of 200 msec; Priority 2 assures transmission in 15 sec; and Priority 3 assures transmission in a maximum of 30 minutes.

The standard grade of service will provide for end-to-end transmission of data in a maximum of four hours.

Within the four transmission service grades proposed for the BDN, three transmission delivery options will be available. These designations will be known as "standard," "deliver when authorized" and "timed delivery."

"Standard delivery" means data is transmitted directly to the addressed terminal or host CPU. If the destination device is busy or off-line, the message is held at the serving BDN node. Attempts to deliver are made at one second intervals.

"Deliver when authorized" means data is sent to the BDN destination node and held in the user's general-purpose storage until the terminal or CPU requests it.

Under the timed delivery option, data is delivered at the destination node at the time of day specified by the user.

Local Nodes

Terminals and computers using BDN facilities will terminate at a communications port at a local BDN node. Such BDN node ports, according to the AT&T specifications, will be similar in functions to ports found on communications front-end processors.

The BDN service will include access charges that cover transmission between the user's premises and the BDN node. Terminations at a node will depend on the equipment which the user has attached to the access line.

Port accesses at a BDN node will be configured to support "specific digital communications protocols, equipment and, in some cases, specific software packages," according to the BDN specifications. From the user's standpoint, the BDN node appears to be a "compatible pseudoprocessor."

The network emulates host processor acknowledgments of received transmissions, but this is meant to signify only that data is "properly received" by the network and not by the host CPU or terminal.

According to the BDN document, users will be able to mix equipment used on the BDN network, with ports designed to accept each type of terminal in the user's net.

Several types of device control are described in the BDN specifications. IBM asynchronous Ebcdic line control will be available to support the IBM 2740 Model 2, Data Measurements Model DMS 442-2, Diablo 1550, Memorex Model 1242 and Telex Terminal Communications Model TC 241 terminals "when equipped with features and options compatible with the 2740-2," the Bell document said.

The asynchronous Ebcdic control will support only polled devices, with each device being polled every 500 msec. BDN access for this line control will require a Bell 202 data set or equivalent unit with 30 msec line turnaround delay. This BDN access will be a four-wire half-duplex facility with continuous transmit carrier, the specifications said.

Access Arrangements

Three access arrangements will be provided under this Ebcdic line control — dedicated, outward dial and shared usage. Dedicated access can include two to 20 terminals as long as the terminals are all on the same premises. This type of access includes a dedicated private line between the BDN node and the user's premises, the AT&T specification said.

Outward dial access uses the dial-up phone network to access a terminal with BDN-compatible autoanswer features. The packet service will provide both dedicated and "shared dial" access port.

The third access arrangement available under the Ebcdic line control will be a shared, multiuser, multidrop line. This arrangement will be limited to Priority 3 and standard grades of transmission because of multiple users sharing a single BDN node.

The Ebcdic line control will support terminals operating at 300-, 600-, 1,200-and 2,000 bit/sec. Terminals with buffer storage ranging from 512- to 5,000 characters will be supported. The user must specify the terminal speed and buffer size, the BDN document said.

BDN will also provide the asynchronous Teletype line control used in the Model 33 and the Model 35 terminals. Teleprinters supported under this feature will be the Anderson Jacobson AJ630, General Electric Terminet line, Teletype models 33, 35, 37 and 43 and Texas Instruments TI 733.

CRTs supported include the Hazeltine 2000 and the Teletype Model 40 (Dataspeed 40) models 1, 2 and 3.

The Teletype line control will provide half-duplex asynchronous transmission, Ascii code, dedicated dial access and shared dial access of 110- and 1,200 bit/sec. With this offering, only dial-up access ports will be available, so terminals will have to be equipped with compatible autoanswer dial capabilities, the specifications said.

The AT&T document listed Binary Synchronous access as a third method, but gave no details on its implementation.

Packaged Services

The FDL will allow users to define and tailor their business needs into communications services. In addition, BDN will provide "common user software communications packages" for a monthly fee. These packages will be written in FDL and can be modified by BDN users. User-modified packages will have to be submitted to the BDN Customer Software Support Center for "validation."

The center will test "all customer-written or altered FDL programs to ensure they do not impact other users or network operations."

The four packaged services available on BDN will be data entry, transaction, storage administration and terminal/host addressing. These were described as communications services in the Bell document.

Asked for a comment on BDN, an AT&T spokesman said the company could not comment on services which had not yet been announced.

Any document being quoted with regard to unannounced services would be an internal document and contain proprietary information; in view of this, AT&T would not be able to answer specific questions, the spokesman said.

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New NCR Upkeep Policy Riles Users, Dealers

By Toni Wiseman
CW Staff

DAYTON, Ohio — NCR Corp. has generated a ripple of concern in some corners and a furor in others with the rewriting of its maintenance policy.

The new policy "clarifies that NCR does not have an obligation to automatically continue on maintenance service units or systems sold directly from one user to another or through third-party marketing representatives," according to an NCR spokesman. "Any such representation by anyone will not be supported by NCR."

All equipment sold by anyone other than NCR will now be inspected prior to approval for maintenance services. Such inspection was previously required only if the equipment had been out of service for more than 60 days, the spokesman explained.

The new policy, according to NCR, is a "tightening, extension and clarification of language differences and emphasis" in its previous policy. It was also designed "to clear up certain areas where nothing was said before," the spokesman stated, noting that "what is written policy and what is practiced is sometimes a little different."

NCR's opinion is that users are "not up in arms about it, but are concerned about it," he said.

That concern was demonstrated by a series of weekend meetings between several users and NCR executives including Bob Gaines, NCR's vice-president for domestic maintenance.

Before the meetings, Charles Yahn, president of the Federation of NCR Users, said he was "optimistic that [NCR] will come around to what we feel we need." He was still optimistic after the meeting, when NCR guaranteed him it would alter some points and wording. Yahn hoped to have a final draft of the policy by last Friday.

Others, however, are more distraught about the situation. Guy Simo, president of Computer Enhancement Corp., a firm which takes NCR memory in trade for its product and resells it, charged the new policy causes the value of equipment to drop to zero.

This, he said, is because NCR "will not recertify for maintenance any equipment sold by anyone but NCR, including [intra-user] sales."

Simo discovered the policy change during sales negotiations with a customer in Middletown, Ohio. The policy, he said, had been drafted a month ago and was being issued to district offices.

"It is our contention that NCR would have issued this policy internally and would not have let the NCR users know of the policy change. Users would have found out about the changes on a selective basis when needed," Simo charged.

Policy Differences

The basic policy has remained pretty much the same, according to NCR, in that the company stipulates it will inspect equipment to see that it works correctly before it agrees to put the equipment on a maintenance contract. The wording of the earlier policy provides that the equipment qualifies for acceptance for maintenance after an inspection and any charges to the customer will be limited to certain items such as in-transit damage.

The new policy states NCR will install the equipment, make a thorough examination and do the work to put it into satisfactory condition. The cost of the services will be borne by the prospective user.

The old policy provided for payment on an hourly service rate; the new policy calls for a flat rate, he noted.

He said the new policy also contains general statements to the effect that "NCR's first obligation is to support its direct customers. Its field engineering division will support these direct customers and NCR's own marketing effort" before the efforts of others.

Firm Charged In Stock Scheme

(Continued from Page 1)

serves to cover claims against its policyholders. For example, if a policyholder has an accident and the insurance adjuster estimates the damages at $500, then a reserve of $500 is set aside to reimburse the policyholder after the car is repaired.

What the "Clean" program did was prohibit any increase in claims after they were filed. For example, it might later be found that someone was injured in the $500 accident and the claim might rise to $5,000. The adjusted would send in an updated claim for that amount, but the "clean" program would not register the additional $4,500 liability on the company's books.

In many cases the amounts of claims rise before they are finally settled, the investigators noted, adding that on one day called "Black Friday" in the complaint the "clean" system wiped $1 million off Fisco's liabilities.

Because Fisco was not reporting all of its liabilities, its earnings picture looked better than it actually was, the complaint noted. While the program was in operation limiting Fisco's liabilities, the firm was reporting earnings increases of over 100% per year — and this boosted the firm's stock to a high of $36 per share, SEC indicated.

However, when the fraud was uncovered, the firm, which at one time had written $57 million of insurance, had a loss of $39 million in 1973.

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Meeting Set to Cover Transborder Data Flow

(Continued from Page 1)

Concern for these issues has produced the movement in Europe to protect national sovereignty, minimize vulnerability and consolidate technical achievements through national privacy laws and international agreements. Some U.S. officials even fear development of a "data cartel," sources said.

Most U.S. officials who will be represented at the Vienna meeting hope reciprocal agreements on the protection of data "can be worked out," sources said.

As early as 1975, the Nordic Council, involving Denmark, Finland, Norway and Sweden, established a working group to harmonize national privacy laws and to consider an international agreement on data flows within Scandinavia and to other countries. Several other European nations, notably France and Germany, are also moving in this direction.

Members of the European Economic Community (EEC) are also working to resolve differences among themselves. However, the EEC's commitment to a common DP policy and economic concerns may make any eventual agreement broader, Pipe noted.

U.S. Slow to Organize

U.S. business leaders believe an open, competitive market in which data base producers and distributors can provide their goods and services is the approach best suited to its interests, several industry leaders said.

However, they have been slow to organize to present a common front at the upcoming international symposium. Serious U.S. consideration of the issues surrounding transnational data flows has only come this year.

An interagency task force has been established within the U.S. government, consisting of 16 members from seven federal agencies. The group is chaired by Dr. Oswald Ganley, deputy assistant secretary for advanced and applied technology affairs at the State Department here.

But the six months work it has planned for itself has yet to be done. "The U.S. is late, and doesn't have an industry advisory committee set up yet," according to Brendon McShane, a consulting specialist with General Electric Co. "We are walking into an international symposium without a position. We are going to get killed."

Others in industry — chiefly the Computer and Business Equipment Manufacturers Association (Cbema) and the Information Industry Association (IIA) — have held meetings and drafted speeches for the international conference or will send representatives to Vienna this month, according to Cbema's vice-president Oliver Smoot.

IIA President Paul G. Zurkowski said his members have concluded harm is already being done to American information services in Europe through surcharges imposed on European users of U.S. goods by the public telephone and telegraph (PTT) authorities in these countries.

"While PTT recognition of the value of information is keeping the door open slightly for U.S. information services, other monolithic monopolies (such as the proposed Euronet) are being created which could foreclose European markets to U.S. services entirely," Zurkowski concluded after a July IIA meeting.

Like Carole Parsons, the executive director of the Privacy Protection Study Commission, Smoot doesn't believe the laws on privacy have to be the same in every country in order for international society to function. Parsons will go to Vienna to explain to the symposium the direction U.S. privacy laws will take if the commission's recommendations are adopted by Congress and the President.

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System Takes Over Voyager

(Continued from Page 1)

several days to understand why the computer was acting the way it was. The delay in finding a solution was caused by the "complexity of interfaces of software and on-board computers," the spokesman said.

First of Two Craft

The Voyager mission is designed to explore Jupiter and Saturn and their satellites. There is also the possibility the second probe might go to Uranus or even beyond.

The second Voyager, called Voyager I because it will reach Jupiter first by a faster route, is now scheduled for liftoff on Sept. 6. Its first scheduled liftoff was delayed for a few minor adjustments, one of which was to install two new springs on the boom system, since scientists thought for a while that the problem was mechanical rather than communications related.

The on-board computers, designed by the Jet Propulsion Laboratory (JPL) for Nasa, are programmed for a greater degree of self-care than ever before and can also direct many of the subsystems on the ship.

In addition, the software can be reconfigured to meet changes as they occur, according to a JPL spokesman.

Ambitious Attempt

This is the most ambitious attempt by Nasa to explore the solar system in an effort which is expected to cost more than $400 million, according to sources. A total of 85 scientists incorporated in 11 science teams are working on the project, a spokesman said.

The instruments on board will gather information from the planets and satellites including data on how they interact with solar wind, atmospheric motions, different types of atmosphere, hydrogen clouds and satellites' orbits.

In addition to telling about a particular planet's conditions, the data might aid in discovering the evolution of the planetary system, a spokesman said.

The two Voyagers will transmit pictures and data using cameras and scientific sensors as well as electronic communication devices.

Fresh Energy

The two spacecraft will get a new charge of energy going from Jupiter to Saturn. Through careful targeting, the two craft will be pulled into the planet's gravity and then sent out at higher velocity to the next targeted course, a spokesman said.

The first spacecraft, which was launched Aug. 20, is following a high-trajectory course which will cause it to take longer to reach Jupiter than the second spacecraft which is scheduled for liftoff on Sept. 6.

The first spacecraft launched will arrive at Jupiter around July 1979; the second spacecraft will arrive three months earlier, in March.

Because of the great distances involved in the interplanetary mission, a 12-foot-wide disk antenna, the largest ever used, was installed in the Voyagers. But even with this improvement, communication by radio signal from Jupiter to Earth will take 45 minutes.

This long communication delay required advanced electronic equipment so the craft can be more independent from earth-based control, a spokesman said.

Commands to the spacecraft are transmitted from an IBM 360/75 in the center to deep space stations around the world and then to the space craft.

Down Link Telemetry

The down-link telemetry also goes through the deep space stations by cable or satellite links to a Univac 1108. The telemetry is processed and then displayed on CRTs at the center.

The data is recorded on tape to be processed later on an IBM 360/75 for charts and plots.

There are six custom-designed onboard computers on each Voyager, two which control altitude computer command, two for the ground system and two for the flight data subsystem which performs the formatting and downlinking, a spokesman said.

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Calls for Gallic Mastery of Models

French Study Urges Independence From U.S.

By G. Russell Pipe
Special to CW

PARIS — "Is it necessary that all models used to prepare monthly or quarterly forecasts of European economic trends have to be designed in the U.S. and disseminated to Europe via networks belonging to American firms?"

A recent report published by the Ministry of Industry and Research here asked this question as it explored the means currently available to amass sufficient data, tools of analysis and dissemination that could bring self-sufficiency in French planning strategy.

In a frank review of French planners' dependence on U.S. data resources and processing methods, J.M. Treille proposed "The Tools for Economic and Industrial Strategies." "The most efficient econometric tools and their suppliers are to be found exclusively in the U.S., from such services as Data Resources, Inc. (DRI), distributed in France by Tymshare; Chase Manhattan Econometrics; and General Electric Mapcast," Treille said.

American organizations such as the National Bureau for Economic Research, the University of Maryland Inforum model and MIT's mathematical model of economic behavior are the best sources of "economic software" for France, he added.

Despite the availability of basic economic indicators and statistics from the Organization for Economic Cooperation and Development (OECD) and the International Monetary Funds, as well as sources such as the United Nations and World Bank, the "monopoly of tools needed for basing modern national economic analysis are on American informatics networks." Today it is easier to process and interpret data from OECD in France on the DP nework of DRI than the French statistical institute Insee, "which has the data but cannot organize [it] for sufficient accessibility by users."

Interference Feared

Dependency on a foreign power for crucial information resources is at the root of French concern. This is indicated by Treille's "basic questions about the monopoly situation:

"Will the control of the tools and data lead to imposing hypotheses, results and thereby indirectly to policy choices?

"Will all these resources be accessible without regard to French data processing or telecommunications policies?"

And, striking a somewhat political tone, he asked: "Aren't the European economists capable of developing research systems for economic decision-making without injuring cooperation with the U.S.?"

How can this condition be reversed? Treille called first for a mastery of the models, software and integration of data sources by:

- Reducing the use of American networks.
- Improving European supplies of basic data and avoiding the American data banks.
- Initiating research into "reconstituting all or major parts of existing [American] data bases on a continuing basis."
- Constructing more suitable, flexible models by departing from classical approaches to economic analysis.

The econometric service market is largely American, Treille noted, so U.S. commercial networks have become highly sophisticated in organizing the necessary data, creating models and software to effectively prepare economic indicators and industrial planning information.

Europe, on the contrary, is less developed because of lack of demand for such services and absence of a commitment to such an effort, he indicated.

Another factor is that "dynamic data" in American systems is much more readily available than statistical information which the user can obtain directly from European sources. The American data is easily accessible in a form for conversion and treatment; it can be retrieved soon after events or time periods have passed.

Indigenous Industry

The study was a two-year effort designed to present and analyze sources of French economic and industrial data and indicate where the French government and others in Europe may begin an indigenous program. It essentially tells French officials to take a cue from American enterprise and gear up and perform economic analyses by building their own capabilties.

The French abhorrence of foreign dependency is very much present; the emphasis is on what the country must do for itself. Such developments as a national public data network, the Euronet system for exchange of information and even the move by postal, telegraph and telephone authorities to crowd private networks through volume-sensitive pricing seem to indicate that protectionist policies are in the wind.

It seems in the short run, however, that the French cannot restrict the present services because there is no real domestic capability to put in their place.

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Justice Brief Gives Interpretation of Antitrust

By Molly Upton
CW Staff

SAN FRANCISCO — What constitutes a violation of Section 2 of the Sherman Antitrust Act?

With directed verdicts issued in the antitrust cases brought against IBM by California Computer Products, Inc. and by Greyhound Computer Corp. — and with a reversal of the ruling in the latter case — many observers are asking that question.

The Justice Department outlined its version of what a plaintiff needs to demonstrate in order to prove monopolization in violation of Section 2 of the Sherman Act. The description was contained in a friend-of-the-court brief filed in support of the Calcomp motion asking the Ninth Circuit Court of Appeals here to overturn Judge Ray McNichols' directed verdict and to order a new trial (see story on Page 1).

"Monopoly power is the power to control prices or exclude competition," Justice stated.

The plaintiff must prove both that the defendant possessed monopoly power in a relevant market and that it engaged in conduct with the purpose or intent of exercising that power, according to Justice. However, "proof of a specific intent to monopolize is not required."

This "requisite purpose or intent can be established by examining the defendant's business practices to see if they were designed to acquire or maintain monopoly power or had that effect . . .

"Where a company possessing monopoly power engages in business practices which, though not unlawful in their own right, are more restrictive than necessary on competition in the relevant market, the trier of fact can infer from such conduct that the company acted with the purpose or intent to exercise monopoly power," Justice said.

Thus one does not need to prove the defendant's business policies were "predatory."

The plaintiff need not prove the defendant obtained or maintained his monopoly power through restraints of trade that are illegal under Section 1 of the Sherman Act, Justice said. Such proof, however, would in itself be sufficient to prove the defendant had acted with the purpose or intent of exercising monopoly power.

To determine whether a defendant possesses monopoly power, "the finder of fact must evaluate a number of facts including the structure of the market, the market shares of the companies in the market, the entry barriers into the market and the behavior of firms in the market," Justice indicated.

The determination of whether a firm has a monopoly share in a market should be left to the jury if sufficient statistical evidence is given indicating a company possesses a very large share of a relevant market, the brief stated.

Also, "the issue of whether a defendant has acted with 'the purpose or intent to exercise' monopoly power is largely a factual question which can only be resolved by examining the totality of the defendant's activities and the impact of those activities."

Calcomp Appeals Verdict in IBM Lawsuit

(Continued from Page 1)

ment should be reversed if he did not apply the proper standards in considering IBM's motion for dismissal of Calcomp vs. IBM, according to the brief filed by John H. Shenefield, acting assistant attorney general.

The moves followed closely on the heels of a decision by the same Appeals Court to overturn a lower court's direted verdict and order back to trial the antitrust case of Greyhound Computer Corp. vs. IBM [CW, Aug. 29].

Mindful of the three years and four months the Ninth Circuit took to consider the Greyhound case, Calcomp also petitioned for an expedited hearing.

One Overriding Question

The Calcomp brief observed that the "dispute involves a singular, overriding question of the law: may an alleged monopolist, in reacting to competitors challenging its monopoly position, engage in conduct which is either calculated to or will inevitably operate to effectively eliminate them?"

McNichols apparently agreed Calcomp had established sufficient evidence to permit a jury to decide whether IBM had monopoly power in one or more properly defined "relevant markets," Calcomp indicated.

"The crucial question dispositive of this litigation," Calcomp said, "is whether the acts and practices of IBM in preserving that position constitute a violation of either the monopolization or attempt to monopolize clauses of Section 2 of the Sherman Act, or both."

In addition to citing evidence supporting Calcomp's contentions regarding market share, the brief detailed those steps by which IBM "deliberately sought to preserve its monopoly power by suppressing competitors."

Department Concerned

The Justice Department, in its friend-of-the-court brief, indicated that private antitrust actions play an "important supplemental role" in the enforcement of antitrust laws and frequently involve significant issues of antitrust policy.

Thus, the department said, it is "concerned that the district court did not apply the proper legal standards in considering the motion.

"Summary procedures, such as motions for directed verdicts, are rarely appropriate in antitrust cases because of the complexity of most such litigation and because motive and intent are, in many cases, among the several significant issues which only the trier of fact can resolve," Justice said.

Because McNichols did not explain his decision, it is possible the decision was based on an erroneous view of Section 2 of the Sherman Act, according to the Justice brief.

Justice argued that since Calcomp had apparently established relevant markets to McNichols' satisfaction, it was up to the jury to decide the other two issues — whether IBM possessed monopoly power and whether it had "the purpose or intent to exercise that power."

"These issues, however, are inherently factual in nature and must generally be resolved by the jury after receiving appropriate instructions from the court," Justice said.

Statistical evidence may constitute prima facie proof of monopoly power in a market, but the exact percentage of market share varies from case to case depending on the relevant market, Justice continued.

"Since Calcomp presented evidence indicating that IBM possessed a very large market share, it apparently presented sufficient evidence to send this issue to the jury — assuming Calcomp's evidence was not so inherently unreliable that no reasonable juror could have believed it," Justice stated.

"Logically, therefore, the district judge could not have directed a verdict because of a failure of proof on this issue without improperly weighing the evidence of substituting its judgment for that of the jury."

Observing that business practices that are legal for a nonmonopolistic firm may be illegal for a monopolistic entity, the Justice Department said a jury could have inferred from IBM's conduct that it acted "with the purpose or intent to exercise monopoly power if its business practices were more restrictive than necessary on competition in a relevant market."

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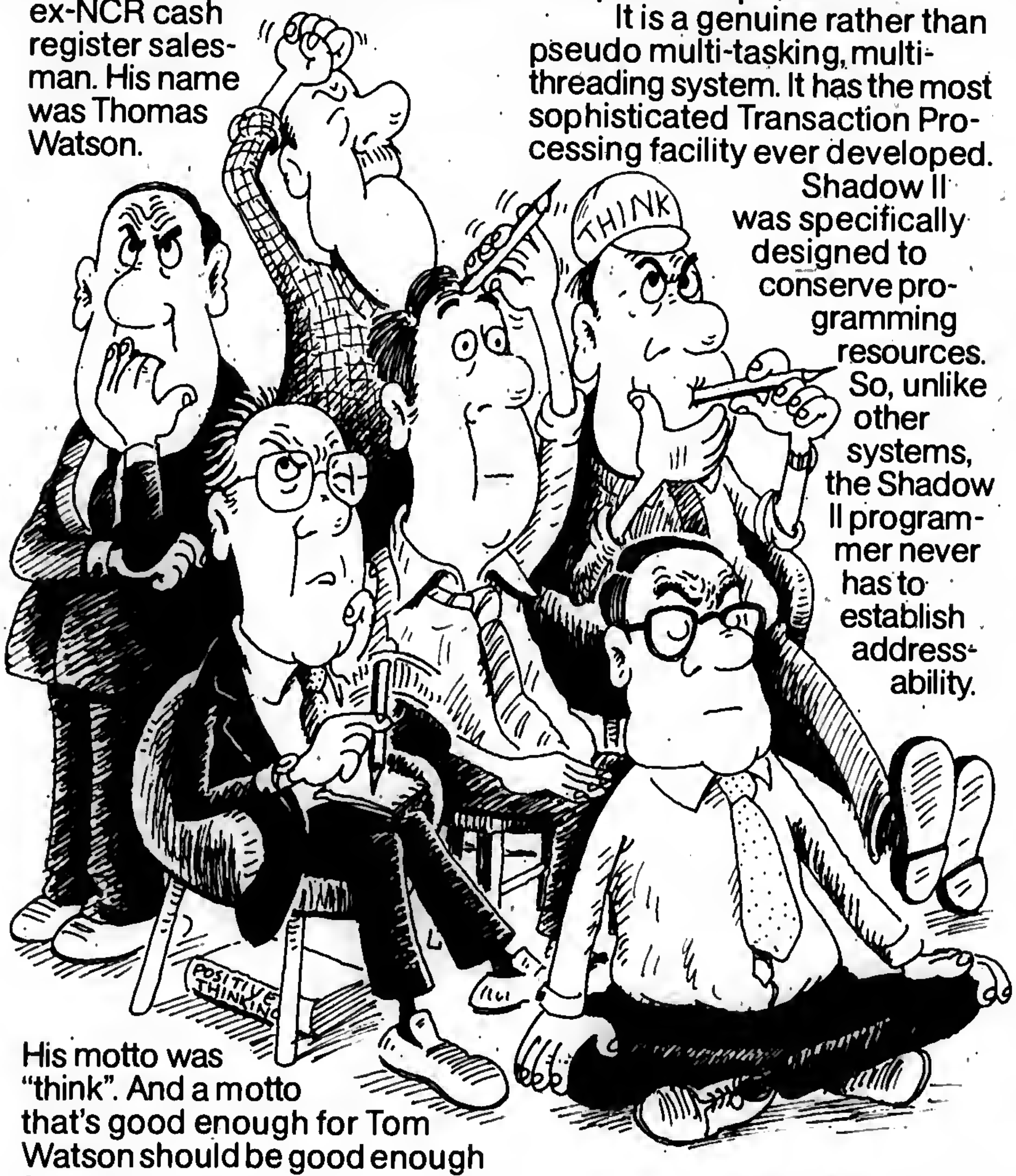

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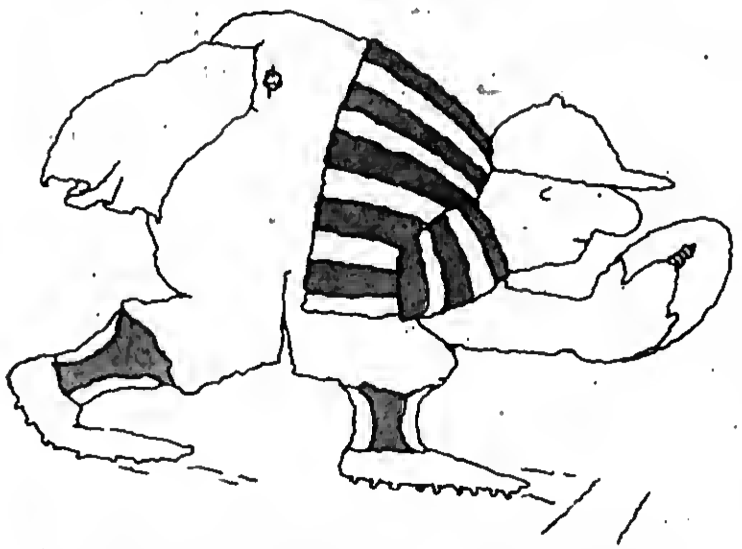

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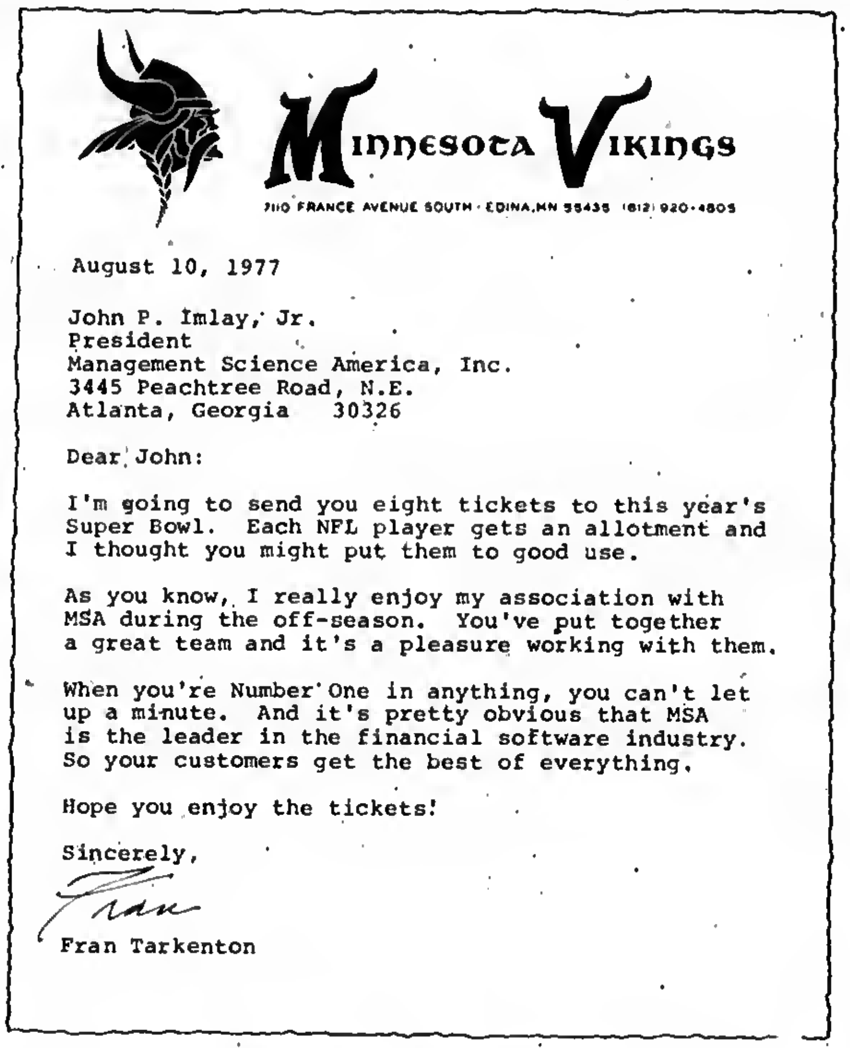

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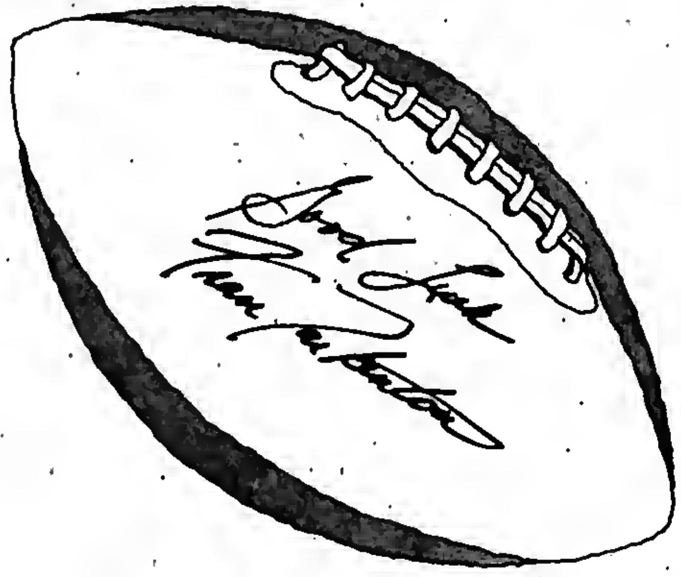

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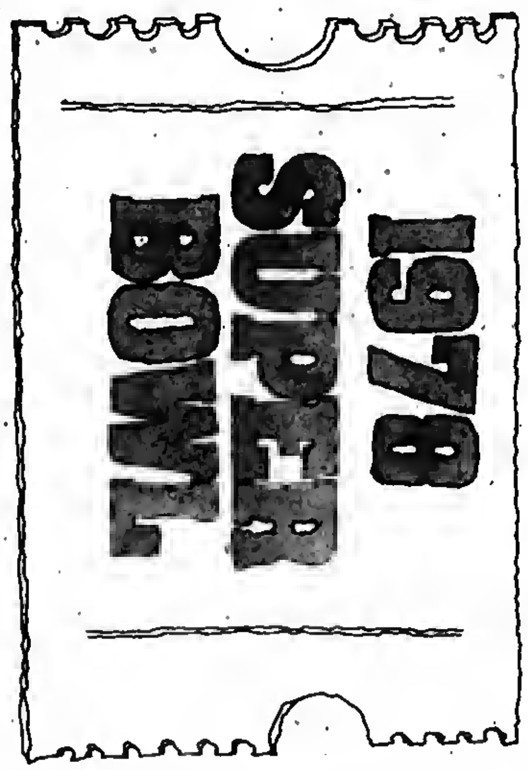

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Dutch Find Them Contradictory

Newspaper Hits U.S. Privacy Recommendations

By Nancy French
CW Staff

ROTTERDAM, The Netherlands — The European business community is apparently troubled by the way the U.S. Privacy Protection Study Commission has proposed to deal with personal privacy in the world of recordkeeping, judging from an editorial in the *NRC Handelsblad* here recently.

Holland's national financial daily newspaper, considered equivalent to the *Wall Street Journal* in the U.S., called the commission's analysis "impressive," but found its recommendations "fragmented" and "contradictory" in some fundamental respects.

The commission's report indicates "Europe and the U.S. are in danger of each going their own way in protecting privacy" in recordkeeping, the editorial said.

Going separate ways could have a serious impact on data which now flows from country to country as part of international business.

Cited as contradictory was the commission's assertion that it wants those that maintain the data to spend their money on improving their record systems, rather than on expensive court cases. However, the commission's recommendations place all the responsibility for assuring they have improved their systems on the individual data subject.

It is the individual who will have to go to court with his complaints, the editorial pointed out.

Further, "the American report acknowledges that the individual approach to the privacy problem cannot be expected to solve the more systematic aspects such as bureaucracy.

"Indeed, one cannot expect from individual complaints and court cases that they will produce 'people-oriented computer systems,' as it is called in the jargon. To further this, one needs policy initiatives [but] the proposed, semisoft Privacy Board lacks the weight even for that," the editorial charged:

The American commission reached its conclusions without even mentioning European legislative initiatives. "Data traffic between the U.S. and Europe has been called, with good reason even now, the lifeblood of many multinational companies. This is the trend; data transmission is the future.

"That the American business community has succeeded to block penetrating privacy regulation for the private sector can be called a Phyrhic victory. Of course, harmonizing the privacy initiatives within Europe promises to be quite a problem. The German Bundesdatenschutzesetz that was published in February was weaker than the Swedish Data Act of 1973, and now Denmark has published its own 'mild' variety.

"But these diverging European bills at least put a bottom line in the market where the American commission leaves holes," the editorial said. "It is inevitable that European governments will conclude that reciprocity in the protection of personal data traffic . . . is not sufficiently guaranteed.

"Canada has experienced this already from the U.S. From these suspicions to restrictive measures is only a step."

Norwegian Privacy Bill Seeks Licensing

By G. Russell Pipe
Special to CW

OSLO, Norway — The government here has proposed a privacy law that calls for licensing DP installations that handle personal data in both the government and private sectors.

The law, which will be considered by Parliament later this year, gives personal information a broad definition, applying it to identifiable individuals, organizations or foundations.

A rule of relevance to user needs is applied, except that information on race, politics or religious convictions, suspected criminal activity, trial or conviction, health, drug abuse, sex habits and family affairs may not be collected without clear justification.

A control board of seven members will be responsible for monitoring general developments in personal record keeping, advising organizations of ways to improve their practices. It will conduct inspections and maintain a register of all licensed systems.

Licensing would be required of most DP operations handling personal data, specifically those holding sensitive data. Also licensed are agencies that provide credit references, direct mail firms and opinion survey companies.

Applications for licenses will require information assuring compliance with:

- Collection and control requirements;
- Processing and storage procedures;
- Linkage to other personal files;
- Secondary use or transmission to other systems;
- Availability of data to person registered; and
- Right of individuals to demand inspection.

A penalty of up to one year imprisonment has been proposed for violations.

Foreseeing a Scandinavian harmonization of data protection legislation, the Norwegian bill provides that some requirements affecting export of personal data can be waived for certain qualifying countries.

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Sept. 27-29, San Juan, Puerto Rico — **Civil Engineering Program Applications.** Contact: Cepa, P.O. Box 1532, Rockville, Md. 20850.

Sept. 27-29, Snowbird, Utah — **Fifth Data Communications Symposium,** sponsored by the Association for Computing Machinery and the Institute of Electrical and Electronics Engineers. Contact: Gene D. Hodge, IBM Corp., Gaithersburgh, Md. 20760.

Sept. 27-29, Washington, D.C. — **National Micrographics Association (NMA) and International Micrographic Midyear Meeting.** Contact: NMA, 8728 Colesville Road, Silver Spring, Md. 20910.

Oct. 2-5, Houston — **22nd Annual Conference of the Association of Records Managers and Administrators (Arma).** Contact: Arma National Office, P.O. Box 281, Bradford, R.I. 02808.

Oct. 2-6, Los Angeles — **1977 Annual Meeting of the Industry Applications Society,** sponsored by the Institute of Electrical and Electronics Engineers (IEEE). Contact: Los Angeles Council, IEEE Business Office, Suite 410, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Oct. 3-4, Washington, D.C. — **Task Master Users Group Fall Meeting.** Contact: Hans Hansen, Task Master Users Group, Inc., P.O. Box 866, Norwalk, Conn. 06856.

Oct. 3-5, Washington, D.C. — **First Annual Symposium on Computer Applications in Medical Care.** Contact: Abund Wist, Virginia Commonwealth University Medical College of Virginia, MCV Station, P.O. Box 16, Richmond, Va. 23298.

Oct. 3-5, Chicago — **First Annual Users and Coordinators Conference,** sponsored by SPSS, Inc. Contact: ViAnn Beadle, SPSS Technical Adviser and Conference Coordinator, Suite 1234, 111 E. Wacker Drive, Chicago, Il. 60601.

Oct. 3-6, W. Lafayette, Ind. — **Fifth Annual Meeting of the International Purdue Workshop on Industrial Computer Systems.** Contact: Prof. T.J. Williams, Chairman, Purdue Laboratory for Applied Industrial Control, Purdue University, W. Lafayette, Ind. 47907.

Oct. 4, Los Angeles — **Western Systems Conference,** sponsored by Association for Systems Managment, Contact: Larry Muich, General Chairman, Price, Waterhouse and Co., 606 S. Olive, Los Angeles, Calif. 90017.

Oct. 4-6, Moffett Field, Calif. — **Workshop on Future Computer Requirements for Computational Aerodynamics,** sponsored by the National Aeronautics and Space Administration (Nasa). Contact: Dr. F.R. Bailey, Mail Stop 202-1, Nasa Ames Research Center, Moffett Field, Calif. 94035.

Oct. 4-6, London — **Datafair 77,** sponsored by the British Computer Society, Contact: Ruth Rees, OYEZ-IBC Ltd., Norwich House, Norwich St., London EC4A 1AB, England.

Oct. 4-6, Providence, R.I. — **Designing, Developing and Operating Teleprocessing Systems.** Contact: College of Business Administration, University of Rhode Island, Kingston, R.I. 02881.

Oct. 5-7, Port Chester, N.Y. — **Information Industry Association (IIA) Annual Meeting: "Coping With Growth in the Information Business."** Contact: IIA, Suite 904, 4720 Montgomery Lane, Bethesda, Md. 20014.

Oct. 6-7, Dallas — **Conference on Supermarket Electric Funds Transfer Services,** cosponsored by Bank Administration Institute (BAI) and Food Marketing Institute. Contact: BAI Registrar, P.O. Box 500, Park Ridge, Ill. 60068.

Oct. 9-11, San Francisco — **Fall Meeting of the Association of Information and Dissemination Centers (Asidic).** Contact: Asidic, P.O. Box 8105, Athens, Ga. 30603.

Oct. 9-12, Washington, D.C. — **Info/Expo '77,** sponsored by the Data Processing Management Association (DPMA). Contact: DMPA, 505 Busse Highway, Park Ridge, Ill. 60068.

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While Other States Waver

Vermont Excludes DP Services From Sales Tax

By Nancy French
CW Staff

Protestations against taxing computer and DP services have begun to pay off in three more states, including Vermont, Missouri and Tennessee.

The Vermont legislature has amended the definition of a taxable sale set forth in the Vermont sales and use tax law to exclude "computer and data processing services where tangible personal property is transferred as part of such a service transaction." The exemption applies as long as "no separate charge is made for the tangible personal property and so long as the value of the tangible personal property transferred is essentially an inconsequential element in relation to the value of the service transaction."

The amendment went into effect July 1, 1977, but the law provides that the amendment will be applied retroactively if such treatment is to the benefit of the taxpayer.

The new provision would be applicable to firms engaged in batch processing services, acording to Sanford H. Goldberg and Arnold B. Tanzer, both of Roberts and Holland in New York.

Their opinion was expressed in the July issue of the Association of Data Processing Service Organizations' *Tax Newsletter.*

Some Areas Unclear

The conclusion is not so clear in the area of time-sharing, since the wording of the statute does not resolve the issue of whether time-sharing should be viewed as a DP service or merely as a license to use tangible property, the two attorneys indicated.

The extent to which the statute applies to contract programming and keypunching is also uncertain, they said.

Robert M. Sherin, a non-judicial legislative counsel to the Data Processing Management Association (DPMA), disagrees with the Goldberg-Tanzer opinion on programming and DP services.

According to Sherin, "the law acknowledges the broad profession of software and DP services that has been recognized in a number of court decisions handed down recently. As such, both should be included under the law."

While a similar law was passed by the Ohio state legislature last year, the issue is still being fought on a number of fronts, including New York.

A temporary moratorium on software taxes there [CW, Aug. 29] has provided some short-term relief, but the issue has not yet been resolved.

In Missouri, the Department of Revenue amended its sales tax regulation on computer printouts making them nontaxable. The amendment also provides some refunds for companies that previously paid such taxes.

Meanwhile, in Tennessee, the battle against software taxation is still alive, but the class action suit brought by Sherin, president of Nova Computing Services, Inc. of Miami, is in need of support, according to Sherin.

The Federal District Court for the Middle District of Tennessee denied the state's motion to dismiss the class-action suit filed by Sherin [CW, Aug. 8] and ordered the state to answer a motion for summary judgment.

But the court also gave Sherin until the beginning of September to prove that his suit is really a class action.

Sherin indicated the action needs the support of a person, firm or association that is "substantially affected" by the Tennessee legislation.

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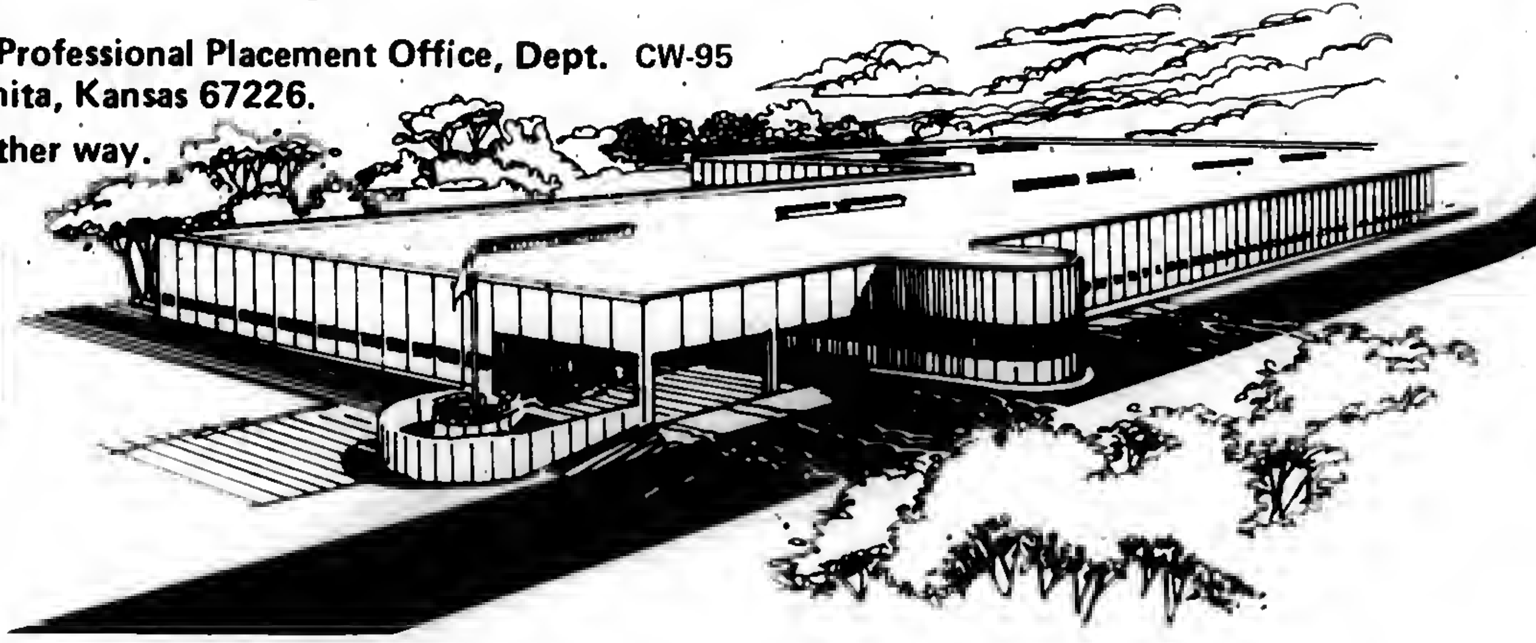

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GAO Reports Saga of DP Contract Overrun

By Molly Upton
CW Staff

WASHINGTON, D.C. — When does a $378,000, nine-month contract become a $2 million plus, 44-month contract for a system that was never completed and barely used?

Or, as the General Accounting Office (GAO) seems to be asking, at what point should a contracting agency know it is "throwing good money after bad"?

A report by the GAO details the saga of an award by the Department of Health, Education and Welfare's (HEW) Office of Education (OE) to the North American Rockwell Corp., now Rockwell International.

The award was for the Project Grant Information System, which was to have helped OE management plan and select new projects; award and control grants; and administer programs and individual projects. The system was also intended to control and forecast program budgets and obtain information on educational trends.

The proposal for the system was submitted "unsolicited" by Rockwell and awarded on a sole-source basis. Rockwell essentially proposed an expanded design of a system it had previously designed for OE.

The contract was awarded in October 1969 for a system that was to have been operational by July 1970 at a total cost plus fixed fee of $378,147.

As of June 1973, however, the price was up to $2.2 million and another $842,000 in costs brought the price tag to over $3 million.

The award was terminated before Rockwell completed all the work it was to have accomplished, the GAO indicated, and in March 1974 the OE abandoned the system, citing unreliability and a high cost of operation.

The OE later prepared a less sophisticated system for about $20,000 that it said met the needs that were to be filled by a simplified version of Rockwell's system. However, Rockwell indicated in the GAO report that this system utilized the data base it had prepared.

Both to Blame

The GAO report, "History of a contract Awarded to Develop a Project Grant Information System," prepared at the behest of Sen. William Proxmire (D-Wis.), exonerates neither party.

The contract "grew because of poor Office of Education management and poor contractor performance. The [OE] did not take strong action to make certain that the contractor would complete work on time and within the contract price," the GAO found.

"Frequent changes in responsibility for the contract within the [OE] also hindered its capability to manage the contract," the GAO said.

Responsibility for administering the contract was assigned to five OE project officers and three organizational entities during the contract period, the report said.

Rockwell also changed personnel. Two months after the contract was awarded, the firm had its third project team on the job. The OE project officer said the second and third teams lacked the expertise to perform the task outlined in the contract.

Rockwell, it said, wanted to make some changes in the system because it lacked the expertise to do the work as originally agreed, the GAO report indicated.

Although several OE officials expressed reservations about the system before the contract, the OE approved 16 modifications.

Didn't Observe Rules

The OE "should have placed greater emphasis on criteria outlined in Federal Procurement Regulations requiring consideration of past contractor performance in determining contract fees, including those on contract modifications," the GAO said.

Rockwell had difficulty delivering products which met with OE approval, yet the awards continued. For instance, Rockwell failed to submit all design documents to OE by mid-April 1970, and those that were submitted were judged unsatisfactory by OE, the GAO reported.

Also, the OE did not always comply with the Federal Procurement Regulations and "circumvented [OE] internal procedures in administering this contract."

For example, after the Sole Source Board was formed to review requests over $25,000, the OE granted a $32,000 extension of the contract without submitting it to the board.

In other instances, the contractor worked without a contract because the OE did not approve extensions promptly, GAO indicated.

On the first major extension of the project, the GAO could find no evidence that officials involved in the project had reviewed Rockwell's proposal before the contracting officer made the award.

Although the OE handled the proposal as unsolicited, it was actually a follow-on effort to earlier contract work. "As such, it did not meet OE criteria for an unsolicited proposal," the GAO said.

The saga outlined in the GAO report includes details such as OE's knowledge that Rockwell would assign personnel unfamiliar with the earlier system.

The scope of the project was reduced after the contract price had reached $1.8 million about two years after the original completion date.

"OE officials told us they had found the system as previously proposed too complex. It required too much data preparation and input and provided reports OE management did not use," the GAO stated.

The GAO observed that "because the available contract documents did not always delineate the costs of individual tasks to be performed in each proposal, we could not determine the amount of funds awarded to cover cost overruns vs. increases in the contractor's scope of work nor whether the overruns were the fault of OE or the contractor."

A review of the unfinished simplified system by an outside firm indicated the programs ranged from "barely adequate" to "useless."

HEW Tightens Controls After Learning Its Lesson

By Molly Upton
CW Staff

WASHINGTON, D.C. — Calling the Project Grant Information System (PGIS) a "case study of a systems failure," the Department of Health, Education and Welfare (HEW) indicated it has learned its lesson.

The PGIS, commissioned by HEW's Office of Education (OE), mushroomed from a $378,000 contract to one of more than $2 million as both OE and the contractor, Rockwell International, attempted to arrive at a usable system.

Although many procedural changes recently made by HEW will prevent such a saga from recurring, the changes are not a direct outgrowth of the PGIS project, HEW said.

HEW has established an inventory of its systems and funding for a new system may not proceed until the developing agency within HEW registers it in the inventory.

HEW is about to initiate a long-range planning process for computerized systems which should "help ensure that the program managers, rather than the systems designers, take responsibility for systems resources," according to a report by the General Accounting Office.

Officials at all levels have been made more familiar with procedures to be used with sole-source contracts.

The contract justification and review procedure has been strengthened so stronger and more detailed justification is required before funds are allocated for new, extended or modified contracts, HEW said.

"The concept of PGIS was sound, but probably too large for HEW's state of the art at that time," HEW said. The system "attempted to do too much at one time.

As originally conceived, it would not only monitor discretionary grants, but also provide abstracting, indexing and cross-referencing capabilities. These attributes were (and are) desirable for such a system. Unfortunately, a similar system did not exist in OE at the time," HEW said.

"The size and complexity of the job undertaken was not adequately comprehended. There was an attempt made to design and put together a system that satisfied all sorts of management purposes," the agency added.

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Editorials

A Stretch, Not a Jump

There have been indications for some time that IBM's Systems Network Architecture (SNA) has not been an overwhelming success with users. And hesitancy about switching to SNA has been reported.

But now an industry consultant has predicted that major changes to the structure of SNA are slated within the next few years, According to Howard Frank, president of Network Analysis Corp., the price performance trade-offs of SNA are not well understood [CW, Aug. 15]. And since there is so little operating experience with the environment that SNA needs, there are few users that have seen fit to transform their existing networks.

It now seems IBM "preannounced" the SNA concept to achieve a marketing advantage with users who were on the threshold of making teleprocessing decisions. But users who considered the architecture, together with its required software and hardware upheaval, have found few benefits that have actually been proven in the field.

There is certainly no mass immigration to SNA. And if Frank is correct, it will take some hard performance statistics together with attractive costs to cause users to jump into this environment.

All this may leave IBM with few options other than a major rewrite of the SNA specifications. It may be that SNA was ahead of its time; it is also possible that SNA is actually a way to increase dependence on IBM products or that it is too complex for users to grasp.

Whatever the cause, users apparently will force IBM to make some major modifications in the near future.

In the meantime, there seem to be few users that cannot upgrade their networks within existing, more readily available data transmission options. The message here may be that it is better to stretch existing technology than to jump for the first brass ring that comes along.

No Retreat

A recent survey of minicomputer users showed there is still serious concern about the software support provided by minicomputer vendors [CW, Aug. 29]. About 25% of those surveyed said there is room for improvement in the software provided by their procssor vendor.

The mini business grew up as an "iron-only" area at first; only later did suppliers begin to provide operating system software and applications programs.

Perhaps in this context, software support problems can be excused because they are a relatively new development. But at the same time, vendors of this equipment are multiplying faster than in other segments of the computer industry. And this rapid growth (especially as evidenced by Digital Equipment Corp.) also incurs an obligation to give the user the best possible systems support available.

Part of the sales pitch for minis is that they can do certain jobs more effectively than the number crunchers which preceded them. If this promise is to be kept, there must be high-quality systems support.

The minis continue to offer users economies of scale over mainframes, but if they operate at less than achievable efficiency, they will — like many mainframes — be wasting processor power.

The mini makers have pledged to give users the systems support that is required. This is an ongoing commitment from which these vendors cannot and must not retreat.

Data Past

Five Years Ago
Sept. 6, 1972

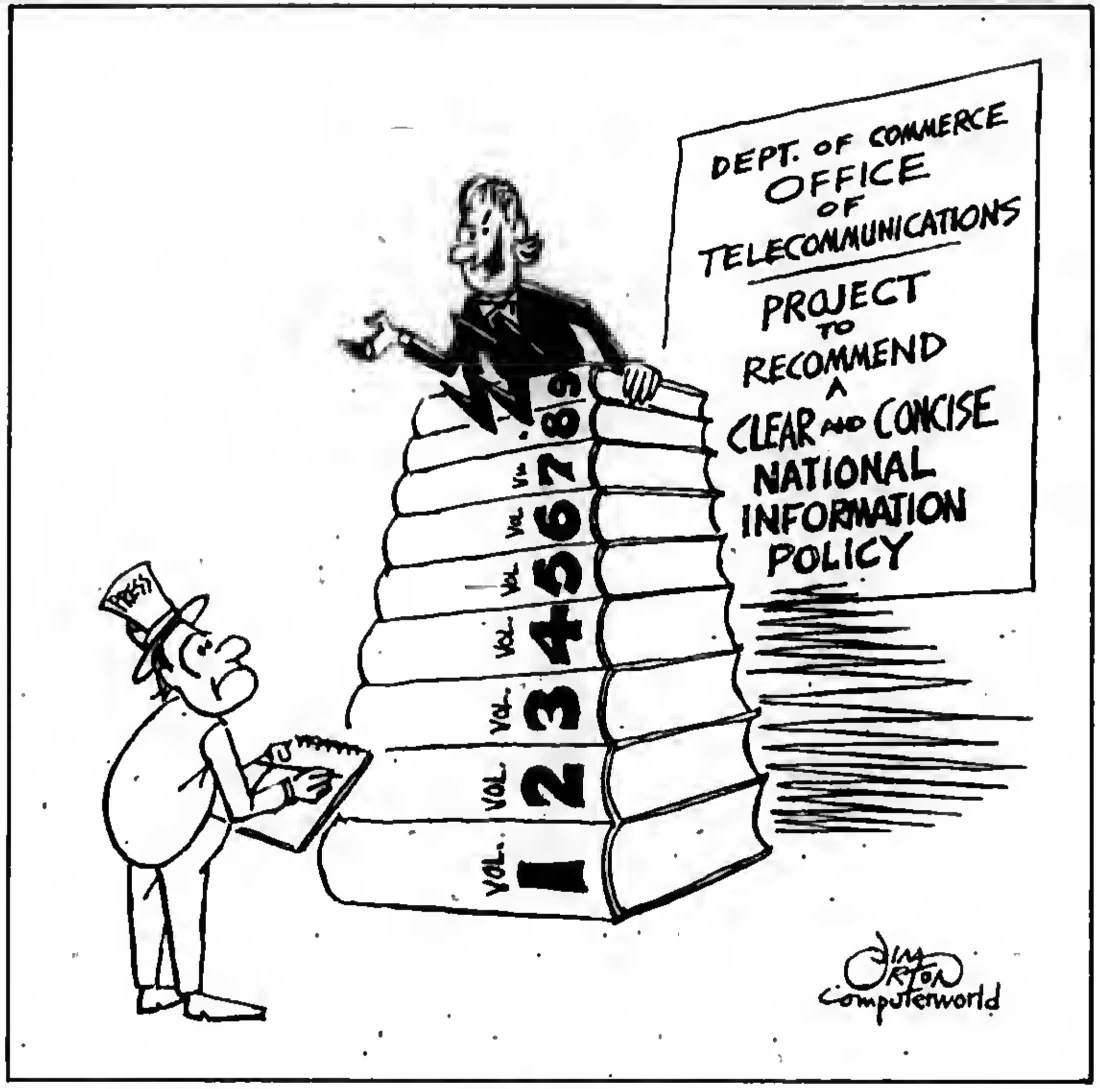
WASHINGTON, D.C. — A study released by the General Accounting Office (GAO) revealed that computer performance evaluation techniques — both hardware and software — could increase the productivity and efficiency of computer systems. GAO found the use of such techniques resulted in government savings of 20% to 40% and therefore recommended their use be encouraged by the Office of Management and Budget for governmentwide use.

— — —

WASHINGTON, D.C. — A Nixon Administration-sponsored bill was introduced in the Senate by Sen. Roman Hruska (R-Neb.) to permit greater access to the records in the FBI's Computerized Criminal History data bank of arrest records. The bill, which proposed stricter penalties for misuse of the data, was introduced at the request of the Justice Department in response to a U.S. District Court decision that banned the dissemination of such files outside the U.S. government or local law enforcement agencies.

Eight Years Ago
Sept. 10, 1969

NEW YORK — Data Network Corp., user of Scientific Data Systems (SDS) 940 time-sharing system, sued SDS for $10 million in compensatory damages and $1 million in punitive damages. The suit, filed in federal district court here, charged the equipment was "totally inoperational for repeated and protracted periods." Data Network planned to stop offering service on the 940 and switch its customers to a General Electric computer and an IBM 360/40, a spokesman said.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JIM ORTON
Computerworld

'. . . *And What Further Evidence of the Problem Do You Need Beyond the Size of Our Final Report?'*

Letters to the Editor

Leaving Out Quite a Few

I was initially impressed by Jack Stone's attempt to analyze the attributes of a successful DP department [CW, Aug. 22]. I am in agreement with "his" theorem in which he discovers the DP department also contains humans.

However, I am amused that he seeks this management attitude in only one class of DP installation. I am dismayed that Stone had to disqualify an apparently successful installation because it was "science-oriented." Perhaps he could better negatively prove his theorem by limiting his category to people who process payroll on Tuesday in Roman numerals.

Stone is already leaving out quite a few of us.

J.W. McGonigal
Ann Arbor, Mich.

Question of Liability Coverage

Readers of Alan Taylor's Aug. 1 and Aug. 8 columns regarding IBM's reaction to the amended Australia Trade Practices Act should know the following:

IBM, along with a number of other companies, is seeking clarification of one section of the amended act ("Conditions and Warrantees in Consumer Transactions") that may expose a company to open-ended liability. Australian government officials have said some firms have not been able to get insurance coverage for this risk, and IBM Australia insurance brokers say insurance coverage is not available to protect the company against the increased risk.

It is not true, as Taylor stated, that IBM is objecting to the "Unfair Practices" section of the act. That section was virtually unchanged by the recent amendment, and IBM's internal guidelines on ethical conduct of its employees worldwide are in keeping with it.

Taylor also stated that IBM Australia's action could "strangle" IBM customer operations there. That won't happen. It should be noted that contracts in force before July 1, 1977 are not affected by the amended act.

Ralph A. Pfeiffer Jr.
Chairman
Chief Executive Officer
IBM World Trade Americas/-
Far East Corp.
N. Tarrytown, N.Y.

Implications 'Distorted'

The Aug. 22 front-page headline "DP Deprives Workers of Job Satisfaction, Europe Studies Show" is an example of journalistic distortion tht has become far too common in this country. The fact that some study group claims something to be so does not "show" that it is so.

As a matter of fact, an editor with a particular point of view can promote it simply by selecting the right studies and offering their conclusions as fact. Thus we have been constantly advised that one group or another is disadvantaged, one product or another is bad for your health, one business or another is exploiting society — with "studies show" added to imply the existence of hard scientific evidence.

Even more questionable is another headline on the same page: "No Argument: 'DP Causes Unemployment.'" In fact, one of the panelists referred to in the story stated that "on the global level computers will increase employment." Is that what you call "no argument"?

Frederick T. Van Veen
Boston, Mass.

Readers Comment on Degree Requirements

The Human Connection

By Jack Stone
Special to CW

Although I often cavil about the lack of communications in our business, whenever I solicit letters on deeply personal issues, I receive competent analyses. These are usually expressed with proper articulation, easy style and positive intentions.

Now that I have acknowledged all the letters received in response to Regina Litman's letter on the bias against nondegreed DPers [CW, July 4] and completed my initial assessment, I will use this first column on the subject to present two particularly thoughtful letters which provide a basis for understanding the nature of the question and planning future actions.

— — —

The first of these letters is from Earl Chrysler of Kenosha Falls, Wis. who provides a historical perspective:

"... Only a few years ago many employers advertising for programming personal specified 'degree in mathematics preferred." The rationale was not that the person would need to use differential ... calculus as a programmer. Rather, employers appear to have believed that training in high-level mathematics had developed in one the ability to take a statement of a problem and, through the use of disciplined, logical thinking, define the problem and design a procedure for finding the solution to the problem in a minimum of time.

"Further, these persons were accustomed to working with symbols rather than actual numbers. There is a strong similarity between the manipulation of symbols by mathematicians and the manipulation of mnemonic labels by programmers. The value of the symbol and the contents of the address for which the label stands are irrelevant. What is important is the manipulative procedure.

"Why, then, has the change in preference from mathematical education to business education come about? I offer a possible explanation. Before organizations began selecting persons with a degree in business for programming positions, the majority of the programmers would have either a degree in mathematics or no college degree. As time passed, these persons progressed into positions in the systems analysis area.

"When these persons would interact with user department personnel, they typically would have a communications problem. They were computer-oriented and did not know the tasks associated with the functional areas of business, the information needed by persons in these areas or the terminology of the world of business.

"For example, balance sheet, chart of accounts, standard cost, variance report and vendor lead time would be foreign to the former programmers unless programs they had written had required them to learn the definitions of these standard business terms. It probably occurred to all concerned that a person would be more efficient and effective as an analyst if the person were familiar with the structure and operations of various types of business organizations.

"In order to assure that one has such an awareness, the firm would require future analysts to possess a degree in business. If a firm could be sure that persons hired as programmers would never advance to positions as analysts, the firm would probably not be able to justify requiring a business degree for a programming position. Firms, however, do not know which persons hired as programmers will show the ability and desire to do analysis work.

"As a consequence, some firms could reasonably be expected to decide to require a degree in business of all programmers. As the programmers progress to positions as analysts, the organization has, to me, the optimum analyst — one who understands how business organizations function, converses intelligently with both manager and programmer alike, and knows the capabilities and limitations of the hardware and software which will be used to implement a business information system.

"When I see an advertisement for a programmer . . . which specifies a 'strong background in Bill of Materials . . .' I perceive the firm to be one which has a short-range point of view. When I see an advertisement for a Cobol programmer which requires a degree in business, I perceive the firm to be one which as a long-range point of view and believes itself to be acting in the best interests of all concerned."

— —

The second letter is from Duane Abbey of Des Moines, Iowa, and deals with the professionalism side of the issue:

"The 'Degree Requirement' . . . is indeed a difficult situation. It seems to me that there are two primary influencing situations: First is the fact that the field of data processing has not yet fully delineated itself into vocational, paraprofessional and professional levels. Second is the great demand for people who can get the job done regardless of educational background.

"The first situation is starting to be resolved — the whole question of degree requirements is an indication of this fact. The development of this delineation will be a long and arduous task which will be exacerbated by the second situation. Nonetheless, as time goes along we shall see a formalization of job descriptions and standards for various classes of positions within data processing.

"Academic programs are yet to be fully developed within this discipline and, similarly, work on various types of certification and licensing are in progress. The central need is for the development of a recognized body of knowledge and skills. The idea and advent of professionalism is coming to data processing, and it is not too far off for us to automatically think of having a degree just as we do today with engineers, accountants,

(Continued on Poge 17)

Who Should Speak for 'Responsible' DP?

The Taylor Report

By
Alan
Taylor
CDP

There is a tax to be paid by owners of powered aircraft — except under some specific conditions — and such people are expected lo file returns with the Internal Revenue Service (IRS), after registering the aircraft with the Federal Aviation Administration (FAA). The FAA registration, however, covers both powered and nonpowered craft and includes details on manufacturer and model number which could be used to determine whether the aircraft was powered.

Recently, it appears the IRS, when picking up the records and checking as to whether people have filed as they are supposed to, has not been checking the model numbers. It has mistakenly been sending letters to glider enthusiasts, suggesting they are delinquent.

All of which brings up the question whether failure to use the records available to avoid such junk mail is one of the duties of responsible data processors.

That there are some such duties — whether or not full use of available files to prevent junk mail is one of them — seems to be unquestioned by DPers. This I saw in the answers to my recent questionnaire regarding the sale of public records. Everyone seemed to agree such sales should be handled cautiously.

But noticeably absent in the correspondence about the issue were any sources for a definition of those duties. And that is our professional problem now. We need a source for definitions of just what our responsibilities are. Let us look at what is needed and then at what we have from which to make our choice.

Organization Needed

The first thing that is needed, of course, is some form of organization, so that appropriate questions can be asked, information gathered, decisions made and information distributed. It is unlikely that such an organization would be small enough to be run as a charity or that it would be able to sell its publications and attract members in sufficient quantities to be self-supporting. Not just yet, anyway.

So that restricts us. We must find some already existing organization that can be reasonably used as a developer and repository of information.

In addition, the organization should be in touch with the rank and file of the profession, because it is the ordinary practicing members who need to know what precautions to take. It simply is not sufficient to be in touch with committees of various sorts, all talking to each other.

Finally, the organization should itself be neutral in determining the proper duties, even though it should be as aggressive as possible once the ideas have been determined.

So with these three requirements — an existing organization, contact with the rank and file and an ability to stay neutral yet publicize — let us look around and see where such an organization can be found.

The Candidates

There are a number of immediately obvious candidates. Our two standards-oriented groups, the National Bureau of Standards (NBS) and the American National Standards Institute (Ansi), are possibilities. So is the American Federation of Information Processing Societies (Afips). But these three have a basic flaw in that they are simply not in touch with the rank and file data processor. And further, at least as far as the NBS is concerned, they often take strong stances on this type of issue, so cannot be considered neutral.

Our various societies — the Association for Computing Machinery, the Data Processing Management Association, the Society of Certified Data Processors, the American Institute of Certified Public Accountants and the Institute of Electrical and Electronics Engineers' Computer Society — seem equally qualified as potential homes for such a group. They are organized and in touch with various segments of the rank and file through their publications. However, they simply cannot be considered neutral and naturally are competitive to some degree. Dominance by one of them would tend to result in a certain dragging of the feet by others.

Yet the societies form a basis for some of the most informed and knowledgeable comment and suggestions, and they shouldn't be disregarded. So what we really need is an organization with a fourth quality — strong connections with the societies.

This fourth point brings to mind the only existing organization that could successfully handle the job — the Institute for the Certification of

(Continued on Poge 17)

Reader Commentary

The Strange Case of IBM

By Weaver C. Barksdale
Special to CW

As the great detective strode into the headquarters building of the International Business Machines Corp., he was met by his long-time friend and faithful companion, John Watson, M.D.

"Thank heaven you've arrived, Holmes! My American cousins are most distressed over the condition of the company's common stock. It's a total mystery to us!"

"Come now, Watson. Compose yourself and present to me the facts of the case."

"As you are no doubt aware, Holmes, the company has been quite successful over the years and has produced a record unexcelled in the history of corporate enterprise. Yet the price of the stock remains well below the peak level of 340 that it reached several years ago."

Watson explained the reason. Because of contingent liabilities from several lawsuits, the company has accumulated substantial cash equivalent assets, amounting to about $7 billion at the most recent year end.

With a favorable decision having been recently rendered in one of the cases and with business going well, the directors decided to use some of the cash for the shareholders' benefit. It was assumed that, because the company's stock was so heavily weighted in institutional portfolios, the stock price could not advance because of a significant overhang of supply.

Therefore, a decision was made to absorb some of this excess supply by offering to buy a large amount of shares at a price of 280, which was far better than the prevailing market price of 270.

Very few shares were tendered at 280; the market price rallied to 284, but subsequently fell dramatically. Many thousands of shares were sold at prices as low as 245 when they could have been tendered a few weeks before at 280.

Hearing the tale, Holmes lit his pipe and paced rapidly as he pondered the problem. After a few moments (actually less than half a pipe), his steel-trap mind snapped shut upon the answer. He turned to his friend.

"I have the answer, Watson. The directors stated an hypothesis, tested it and found it lacking; yet they have done nothing to further analyze the problem. They presumed that the supply, or more precisely, the demand for holding the stock, was elastic within its recent price range.

"That is, by raising the tender price above the market price, they hoped to acquire a sizable amount of stock. However, they actually found an inelastic supply."

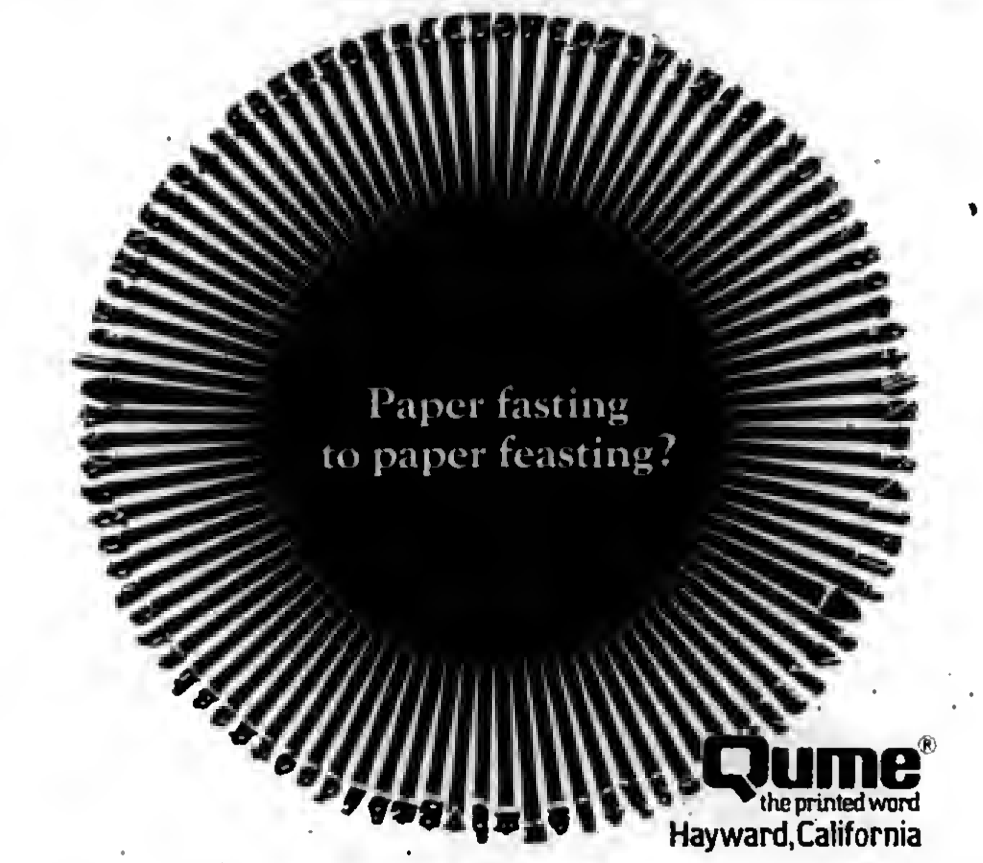
Their mistake, according to Holmes, was that they addressed the question from the wrong perspective. Since there obviously existed little excess supply of the stock in institutional portfolios, the reason why the price would not rise was that there is lack of demand.

To increase demand, interest in the stock should be broadened, he suggested. One way to do this would be to use the excess cash reserves to further increase the dividend.

With its present cash horde, the company is effectively one of the largest financial intermediaries in the world. The utility of these dollars is much higher, from the shareholders' view, in the hands of the shareholders rather than in the company's coffers.

Another means of increasing in-

(Continued on Page 17)



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Who Can Be Responsible?

(Continued from Poge 15)

Computer Professionals (ICCP). This group oversees the various programming, systems analysis and DP management professional examinations. It is run by representatives of all the societies and still fulfills all the other qualifications.

The ICCP is in touch with the rank and file through the examinations themselves and is able to stay neutral as far as development is concerned. Through appropriate use of the examinations, it could publish ideas concerning responsibility. And further, the ICCP, while not wealthy, would not have to try to run on the spare proceeds from selling publications.

So I suggest that the profession and the ICCP consider increasing their service to the DP community. If anyone has other nominations for the repository of ideas about responsible data processing practices, please write to me.

Needless to say, I'll keep you informed about any new candidate. Or perhaps some will reject the notion that a repository is needed — and needed quickly.

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Readers Enter Degree Debate

(Continued from Poge 15)

architects, management trainees, etc.

"As far as individuals already in data processing or about to enter the field without a degree, I would suggest two things. First, be aware of and accept the idea that professional delineation is coming. Second, discrimination based upon degree requirements is a correctable situation (unlike sex or age discrimination). Thus, individuals in this field without degrees should be prepared to pursue an education with the blessing and financial aid of their employers.

"Data processing is a young field and there is much work to be done in this area. The supply/demand factor in connection with data processing personnel will tend to cloud the issue, but the appropriateness of such degree requirements can only aid in the maturation of our endeavors."

More on this in later columns.

Holmes Solves Case of IBM

(Continued from Page 16)

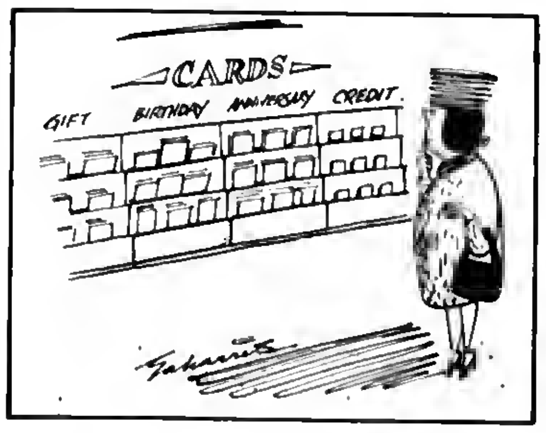
terest in the stock, ceteris poribus, is to broaden the number of holders. This could be done by splitting the stock at least on a four or five to one basis.

A combination of a stock split and a dividend increase would be most effective. The small investor would be attracted by IBM selling at less than $50 per share and with a dividend yield in excess of 5%.

"Holmes, you're a genius!"

"It's simply a case of supply and demand — straight out of an elementary economics textbook, my dear Watson. Elementary."

Borksdole is o vice-president in the Investment Monogement Deportment ond chief portfolio monoger for employee benefit plons of Commerce Union Bonk in Noshville, Tenn.



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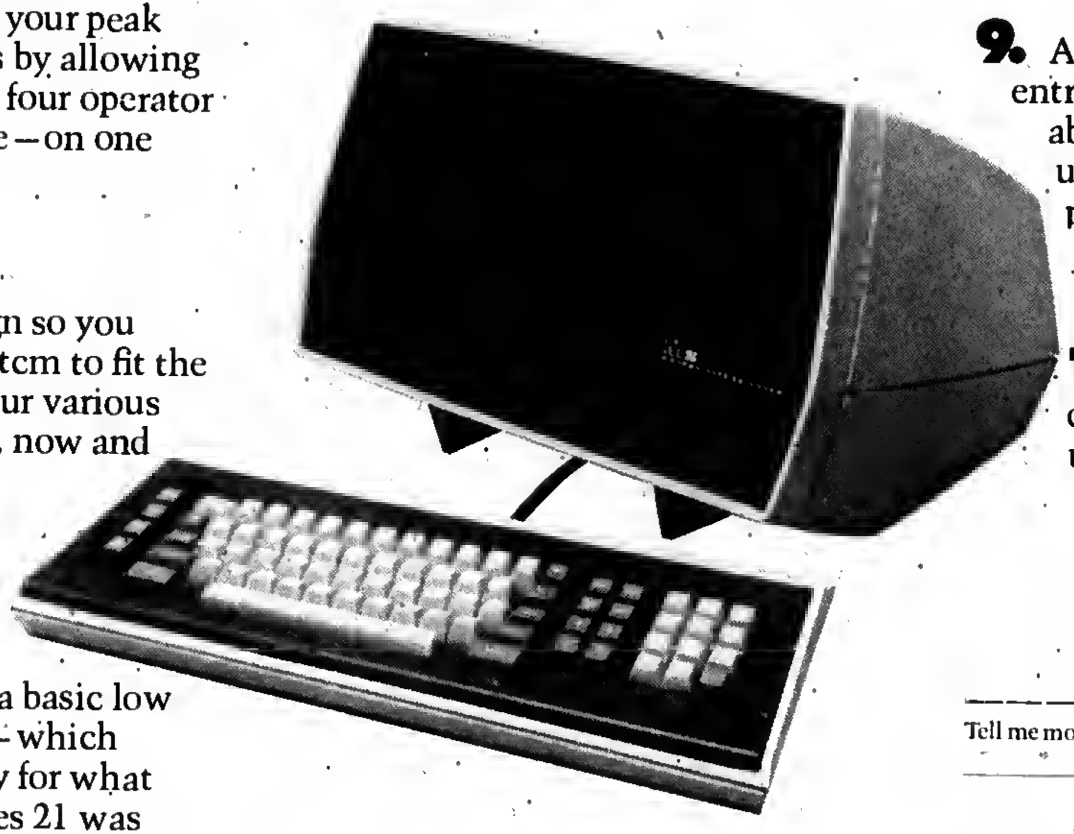

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For MVS System Tuning

'CMF-Realtime' Documents CPE Trends

SUNNYVALE, Calif. — Systems programmers rather than the operations staff in IBM MVS installations are expected to be the primary users of the Comprehensive Management Facility-Realtime (CMF-Realtime) package that will be released by Boole & Babbage, Inc. later this year.

The package allows the user to monitor selected areas of MVS system activity interactively and to evaluate changes in the operating system as they are made, the vendor said. The reports show both current status of various measurements and trends over user-specified time frames of one or more factors, according to a spokesman.

The "trend" portion of the CMF-Realtime display can show how an individual factor changes over time or how a group of factors interact with each other. Sometimes a single measure isn't enough to show a change in performance, but the combination highlights movement — good or bad, the spokesman explained.

Several of the measures, available on a CRT screen or in hardcopy form, are conventional computer performance evaluation (CPE) concerns — CPU, channel and device utilization; paging and swapping rates, for example — but others are specific to the MVS environment.

System Resource Management (SRM) data, an MVS outgrowth of SMF, is one of the newer measures available through CMF-Realtime. In general, the spokesman claimed, CMF-Realtime represents a "significant extension" to the data-gathering capabilities of IBM's Resource Management Facility (RMF) Version 2 under MVS.

The factors to be displayed or reported can be changed dynamically. If one line of inquiry seems to provide no useful information, the focus can be changed, and changed again, until something interesting is found, the spokesman noted.

Because this product has a different purpose than others with apparently similar output — Boole & Babbage's Resolve, for example — it can be used concurrently with them without any conflict, he added.

CMF-Realtime is expected to be available in early November for an introductory cost of $7,500. Boole & Babbage is at 850 Stewart Drive, Sunnyvale, Calif. 94086.

'DMS/OS' Gains TSO Link

SACRAMENTO, Calif. — Available now as a separately priced optional extension of the DASD Management System (DMS/OS) from Software Module Marketing, the TSO Command Processor supports the use of the basic package in a TSO environment.

The most significant enhancements, according to a spokesman, are deferred archive and restore functions and a dynamic restore function.

The deferred support permits the accumulation of data set Archival and Restoration requests from the TSO user regions. These requests are periodically processed by batch jobs, which record the result of the deferring processing in a file which may then be interrogated by the originator of the request, the spokesman explained.

No changes are made in the Data Set Control Blocks (DSCB) to accommodate the deferred processing. All information is stored in a work file which is purged after an installation-specified period has elasped.

The dynamic restore facility can be used to immediately restore a data set from a user region. A tape drive is dynamically allocated to permit loading of the archive tape and the data set to be restored is dynamically allocated on the target DASD volume, the spokesman said.

A control mechanism is included to permit the installation to set a limit on the number of tape drives that can be concurrently allocated in support of the dynamic restore facility, he added.

The basic DMS/OS system is available for $10,000; the TSO Command Processor "selectable unit" costs an additional $1,500, the company said from The Crocker Bank Building Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'Front End' Extends Pay Package

TEWKSBURY, Mass. — The Wang Program Products Division of Wang Laboratories, Inc. has introduced a distributed data collection "front-end" facility for the payroll portion of its Super payroll, personnel and pension management system which runs on IBM CPUs.

The network-based payroll data entry software, Pay/Net, works with operators using Wang's Personal Computer Systems (PCS) as intelligent terminals to the Super host machine.

The Pay/Net help includes prompting messages, immediate verification of entered data and positive control over the operation of the remote site payroll function, a spokeswoman said.

Pay/Net features network data security, she claimed. Terminal identification numbers act as authorization codes to validate access to the network, she added.

The software utilizes industry-compatible protocols and procedures in every component delivered, she said.

The Super payroll system — a prerequisite — costs from $30,000 to $50,000 depending on modules implemented on the user's mainframe. The Pay/Net software costs an additional $10,000 and the PCS hardware costs "about $6,000," the spokeswoman added.

Wang is at 836 North St., Tewksbury, Mass. 01876.

'Hasp-11' Line Gets New Vendor

EUGENE, Ore. — The Hasp-11 family of communications software, developed by Oregon Research Institute to allow Digital Equipment Corp. PDP-11s under various operating systems to run remote job entry applications into an IBM mainframe, is now available from Datanet, Inc., P.O. Box 30008, Eugene, Ore. 97403.

'Oscar' Updated

PITTSBURGH, Pa. — Enhancements in the report generator portion of the Oscar project management system on On-Line Systems, Inc.'s remote computing network now enable users to produce comparative reports in addition to those showing critical path method analyses and resource constraints, according to a spokesman.

With the comparative reports, a project planner can check reported, up-to-date performance against the baseline schedule, he noted.

Status comments for each project activity can be included in the comparative reports. Other enhancements allow the project manager to post status information about activity conditions.

Editing of the original plan while work is under way allows users to add, modify or delete activities to reflect real conditions. Later progress reports are then made against the revised base.

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Needed Resources Cited in Curriculum Plan

J. Daniel Couger On Education

In last week's column, I described the revised curriculum recommendations for an undergraduate program in computer science, prepared by a special committee of the Association for Computing Machinery (ACM). The committee is soliciting comments on its proposal by Dec. 1 before final publication in early 1978.

The report will supercede an ACM report of 1968, commonly referred to as Curriculum '68; therefore I will refer to the new effort as Curriculum '78.

As explained in the earlier column, the new report provides for a 25-course curriculum model. It also discusses implementation, making some strong, specific recommendations concerning resource requirements.

"Data entry devices such as card punches, teletypewriters and display terminals should be provided for program preparation and communication between student and computer'. . . conveniently located and in a large enough area for both easy and convenient student access and use."

Micros Desirable

The ACM Curriculum Committee on Computer Science believes "microprocessors are quite desirable in teaching details of computer architecture previously only attainable by extensive programming of hypothetical computers, simulators or textbook discussions. They have provided a relatively inexpensive and highly versatile resource whch can be used in a variety of ways.

The availability of one or more minicomputers "will allow the students to obtain hands-on experience as well as the opportunity to utilize interactive systems and programming languages which may not be available or practical on a medium- or large-scale computer system."

This kind of equipment also "allows the student to work on software development projects and other projects that might not be possible due to restrictions on the use of the central facility."

A medium- or large-scale computer "should provide appropriate hardware and software support for the major program. Auxiliary memory is required so that access methods specified in the core courses can be implemented and tested.

"Suitable I/O devices and system facilities are needed so that rapid turnaround is possible, interactive computing is available and programming languages used in the curriculum are supported."

The report implies laboratory facilities are frequently inadequate. "Regardless of what specific items of computer equipment are available to support a curriculum in computer science, effective teaching and research in the field requires laboratory facilities. Computer science is in part an empirical science which invovles implementing procedures as well as studying theoretically based processes.

"Because systems, algorithms, languages and data structures are created, studied and measured via combinations of hardware and software, it is essential that appropriate laboratory facilities be made available that are comparable to those necessary in the physical and biological sciences and engineering disciplines."

Software requires attention equal to hardware, according to the Curriculum '78 report. "For the student to master the material in the core and elective courses, sufficient higher level languages . . . [and] special-purpose systems such as statistical systems, data base management systems, information storage and retrieval systems and simulation systems should be available.

"The student of computer science must have available, in some form, language, programming and systems manuals as well as documentation for programs and other materials directly related to the development and use of systems. This material must be easily and conveniently available to the student at all times."

Staff Requirements

No less than six full-time faculty members are necessary to offer the minimal program, in the opinion of the committee.

While it recommends faculty background primarily in computer science, the committee is realistic enough to recognize this is not always possible.

Additional instructors can come from computer center staff and other academic departments, the report noted.

"Articulation" — setting up vertical communication channels with groups outside the institution where the computer science program is being developed — should occur with local high schools and community colleges which provide input to the program. Equally important is discussion with employers and graduate schools which utilize program output.

Curriculum '68 paid little attention to articulation needs. On reading it, one had the impression that the committee intended it to be the bible to which all affected organizations and persons were to conform.

The recommendations on Curriculum '78 are more pragmatic. They facilitate flexibility in curriculum implementation to cope with varying circumstances and resource levels.

Couger is professor of computer and management science at the University of Colorado.

Package Creates On-Line Code

HOUSTON — Batch programmers working with Hewlett-Packard Co. HP 3000s can create terminal-oriented programs "more easily than they might expect" with the support of the Instasystems software from Systems Communication Corp. (SCC), according to the vendor.

Designed for use from local or remote terminals, Instasystems provides a menu approach to program building and later execution that requires no change in the basic system software provided by HP, an SCC spokesman added.

In a typical operation, the system displays a menu of applications available to a user as soon as the user has signed on and identified himself. Once the application is selected, a new menu offers a choice of functions to be performed, the spokesman continued.

From there it works down to the point of displaying data entry screen formats and accepting data which it provides to as many as eight programs.

Instasystems includes a menu-building command so the support it provides is pertinent to the user or users involved. Beyond that, a HELP command is available that displays unique user-written screens of information that can vary depending on when the call for help is made, he said.

Instasystems can work with files created by any of the HP access methods or with data bases under Image he added, but it also has its own indexed I/O support.

The package is available for lease or purchase. The license fee is $5,100, SCC said from Suite 300, 1721 Pech Road, Houston, Texas 77055.

Multimedia Course Eyes Intelligence

KANSAS CITY, Mo. — Developed by MIT, "Artificial Intelligence" is a multimedia curriculum from The Edutronics Group that investigates "the real nature and action of 'intelligence,' " a spokesman said.

The 24 course modules examine "intelligence" as a product of a family of logical qualities that can be studied abstractly without concern for the particular systems that manifest intelligence. The course provides practical knowledge for those interested in making computers more useful as well as insight for those who wish to understand the nature of intelligence, he said.

The lectures and classroom discussion are presented by associate professor Patrick H. Winston, director of MIT's Artifical Intelligence Laboratory.

Edutronics is at 3435 Broadway, Kansas City, Mo. 64111.

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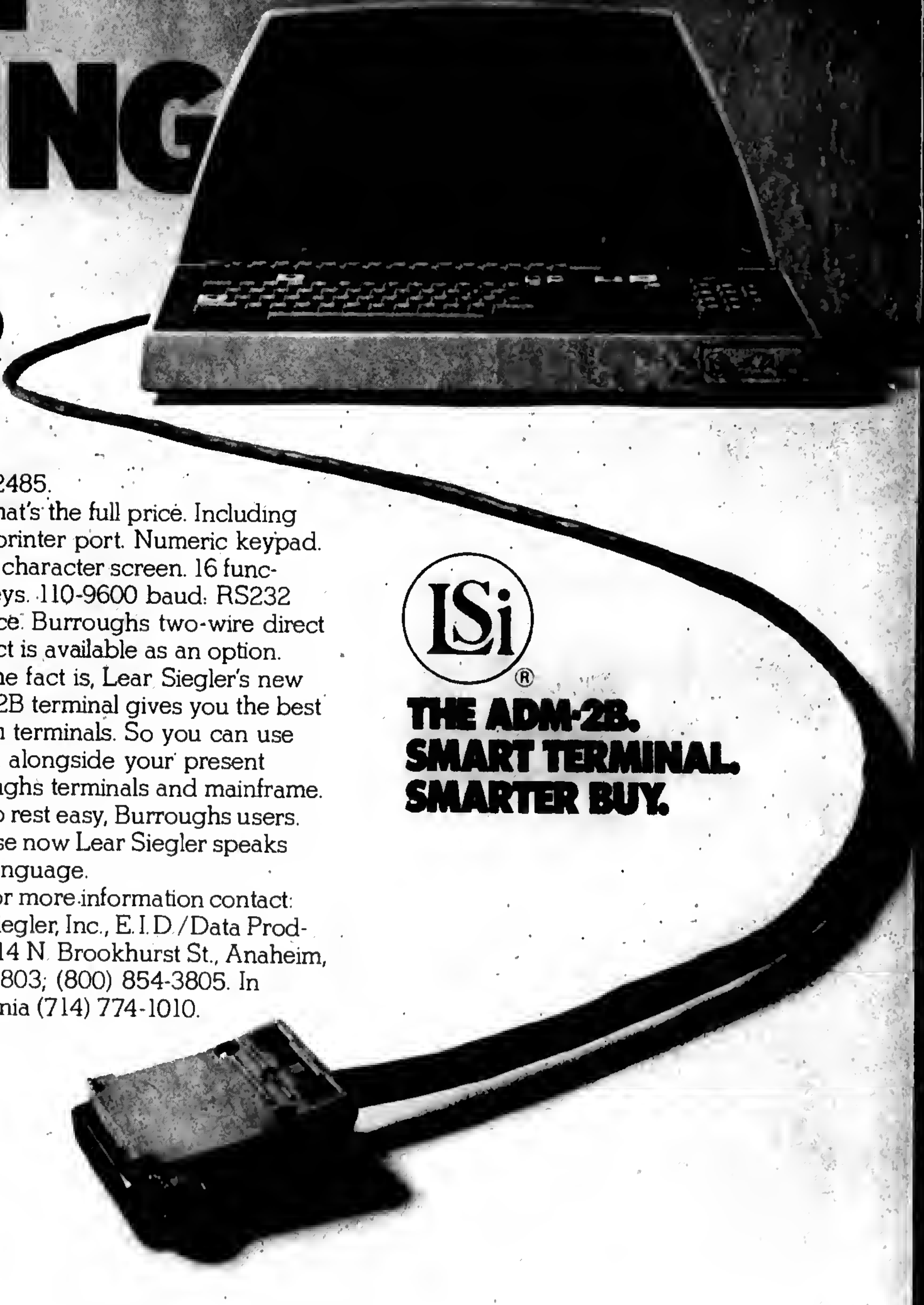

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'Csar' Enhanced

ATLANTA — The Computer Scheduling and Reporting System (Csar) from Computer Concepts Corp. has been updated so there is less detailed work for the scheduling personnel.

With Csar II, the user identifies only the class and priority a job is to have, its successors and the earliest start time it can reasonably use. From that, the package builds a schedule without the constraints inherent in the original Csar system, a spokesman said.

All information processed by Csar II is maintained in a single sequential file which contains, among other things, calendars and records for each production job scheduled.

Written in ANS Cobol, the batch-oriented Csar II has been used on IBM, Burroughs and Honeywell equipment. In the IBM environment, it requires 128K bytes plus a sort region.

Source code for the scheduling package is available now for $9,500, Computer Concepts noted from 6244-A New Peachtree Road, Atlanta, Ga. 30340.

Package Shows Fortran Values

ANAHEIM, Calif. — The Fortran Termination Monitor, developed by Pilkerton International for its own use in debugging program problems, is now available generally for $50.

Designed to work in any IBM OS or OS/VS system, the package does not interfere with normal Fortran program execution, according to a spokesman. It simply "steps in and captures" the values of user-selected variables whenever an Abend occurs, he said.

These values are often the keys to the problem, but they are sometimes difficult to find, especially in floating-point operations. Cryptic error messages and dumps that require conversion from "hex" to decimal before they can be read make debugging an error-prone, time-consuming task, he added.

The monitor can report on as many variables as the user requests prior to run time, but each requires 10 bytes so there may be limits on how many a programmer can retain even if the software logic has no such constraint, the spokesman noted.

The Terminator prints the current values of the variables if a job is aborted with an error. People on the Pilkerton staff have found it so useful they use it even though it's not a required part of the development process, he claimed.

The $50 the company charges for the software covers the cost of reproducing the program, documentation and the postage, he added.

Pilkerton can be reached through P.O. Box 6372, Anaheim, Calif.

'Soup' Eases Updating

ATHENS, Ga. — The Source Utility Program (Soup) from Cosmic reportedly allows the IBM 360-based Fortran programmer to do symbolic updates to selected subprograms, to compile those updated programs and to update an object file, deleting the old object code.

Soup can be used to create a new source file or an object file. It can also produce a listing or a punched deck of the entire file, of the updated subprograms or of the updated portions of code, according to a Cosmic spokesman.

The source and object files handled by the package — which was developed at the Goddard Space Flight Center — are sequential data sets, normally generated as files on magnetic tape. The routines within Soup have been found to be "much faster" than the standard IBM OS/360 utilities that perform the same function, the spokesman claimed.

Soup is written in Fortran IV and has been implemented on an IBM 360, utilizing 26K bytes of main memory.

Made up of approximately 338 source statements, the utility is available only as a listing which costs $25. It should be ordered as program number GSC-12268/ CW, the spokesman added.

Cosmic is at 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

'Disk-O-Tek' Eyes Space

ATLANTA — The Disk Organization Technique (Disk-O-Tek) package from NCI, Inc. is a dynamic disk space allocation system controlled by parameters entered in the JCL stream. It was designed for IBM DOS and DOS/VS environments, the vendor said.

Like a number of similar packages, Disk-O-Tek truncates sequential file extents after the file is closed so overallocated space is made available for other uses. This control measure is applied, however, on a file-by-file basis as indicated by the user.

Marker on Vtoc

Because a number of users are expected not to use the automatic truncation feature without some sort of encouragement, Disk-O-Tek puts an end-of-file marker on the volume table of contents (Vtoc) of all sequential files. In Vtoc printouts, then, the user can see just how much space is being wasted, NCI said.

When that happens, he can invoke the truncation for each of the overextended files and Disk-O-Tek will truncate the extents near the end-of-file marker.

The package also has a utility routine that can delete, revive or locate files generically; produce Vtoc lists of space used and available; or produce a file with all active Vtoc records and print information from selected files in character or "hex" format.

Additionally, the utility allows for the printing of a fixed number of records, number of tracks or number of cylinders.

Disk-O-Tek is available under a permanent license for $2,750 or $110/mo, the company added from 6075 Roswell Road N.E., Atlanta, Ga. 30328.

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Data Briefs

Expo to Focus On Fiber Optics

NEWTON, Mass. — The Fiber Optic Communication and Information Society (Focis) will present a fiber optics exposition here Sept. 15.

Admission is free to Focis members; there is a $10 admission for nonmembers; and the cost is $15 at the door, a Focis spokesman noted.

Further information about "Fiber Optics How and Why" can be obtained from Focis, Box 2264, Vernon, Conn. 06066.

Decwriter II Prices Drop

MARLBORO, Mass. — Digital Equipment Corp.'s Components Group has announced volume price reductions up to 10% on its LA36 Decwriter II.

The 200-unit price has been reduced from $1,390 to $1,250 each. Other reductions vary according to quantity. Price reductions begin at the 50-unit quantity level, DEC said from One Iron Way, Marlboro, Mass. 01750.

HIS Offers Seminars

WALTHAM, Mass. — Honeywell Information Systems, Inc. will conduct three seminars in different cities on communications concepts for large-scale communications users.

The first seminar will be held in Chicago Sept. 7 and 8; the second will be held in Dallas Oct. 26 and 27; and on Nov. 29 and 30, HIS will conduct the third in Los Angeles.

Information on the courses is available from Dave Cook, Manager of Educational Services, HIS, 110 Cedar St., Wellesley Hills, Mass. 02181.

Atlantic Forms User Group

ALEXANDRIA, Va.— Atlantic Research Corp. has formed a users group to exchange Intershake II programs and test applications.

Information on the Intershake II/Users Group can be obtained from Garland Audielet at Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22314.

Stored-Program Controlled

Bell Planning Nationwide Net

MURRAY HILL, N.J. — The Bell System has announced plans for a nationwide communications network that it said will deliver new services and operating efficiencies over the next 25 years.

In addition, Bell has developed a microwave radio system that reportedly will handle three times as many data and voice calls as its current top-capacity long-distance radio link.

Bell's future communications network will involve electronic switching systems (ESS) interconnected by a high-speed signaling system to enable more effective communications, the company said.

The combination of the ESSs and the signaling system is called the stored-program controlled (SPC) network, Bell said.

As the SPC network evolves, users will notice faster setup times for call connections — as fast as two seconds for a coast-to-coast call, according to a Bell spokesman.

Implementation of the SPC network will involve a long-term technical effort, including installation of ESSs in Bell telephone central offices, the spokesman noted.

A complementary part of the effort, he added, will be expansion of the new signaling system, known as Common Channel Interoffice Signaling (CCIS).

(Continued on Page 24)

Project 'Ahead of Schedule'

Terminal Slashes Reporting Time

By John P. Hebert
CW Staff

NORTH POLE, Alaska — A construction firm headquartered in Houston has reduced time, money and project report errors with a key-diskette communications terminal at its building site here.

Before Litwin Corp. installed the Data 100 Corp. Model 77 key-diskette terminal in "the dead center of Alaska," it needed three weeks to send manpower and construction materials needs reports to the home office, according to LeRoy Fronk, Litwin's DP director.

"If construction was delayed past the central Alaskan building season from March to late September for any reason, Litwin personnel would have to pack their bags and come back after the spring thaw, "and that would cost time and money," Fronk said.

Fronk said Litwin has cut construction project reporting time from more than three weeks to less than 48 hours, reduced errors significantly and given its client, Energy Co. of Alaska, a level of detail in its reports that was not feasible with the previous system.

"This has allowed us to act rather than react to changing conditions and that means the difference between profit and loss," Fronk noted.

Before installing the terminal at its campsite 15 miles north of Fairbanks, Litwin telecopied coded sheets containing labor distribution data and units of work completed from remote sites to its Houston headquarters. From there the information was keypunched and transmitted by a Data 100 Model 76 to United Computing System in Kansas City, Mo., for processing.

The process, which took several weeks, produced reports that compared actual productivity to forecasted needs. The resulting reports, which were printed in Houston for forwarding to the remote stations, detailed how a project was doing from both a financial and physical percent-complete basis.

"The problem was," Fronk noted, "that you rarely had time to react to the data. By the time you received it, it was already outdated and with time breathing down your back, you had to make some very sophisticated guesses."

(Continued on Page 24)

Telenet Files With FCC To Extend Service to Hawaii

WASHINGTON, D.C. — Telenet Communications Corp. plans to extend its packet-switched service for data communications to Hawaii this fall in cooperation with the Hawaiian Telephone Co.

The two carriers last month filed a joint application with the Federal Communications Commission (FCC), according to spokesmen for the carriers.

The proposed service offering is designed as an economic means of communications between computers and a wide variety of terminals operating at low to medium speeds. It will be available on a demand basis with rates based on the volume of data exchanged, Telenet stated.

Trans-Pacific cable facilities will be used to connect the Telenet network in the continental U.S. with Hawaiian Telephone's operating center in Honolulu.

The CCITT X.25 packet-mode interface reportedly will be supported by both carriers, permitting synchronous as well as asynchronous communications.

In a tariff submitted with the FCC application, traffic charges have been set at $4 per thousand packets.

Rates for public dial-in service at 10 to 30 char./sec will be $2.40 an hour from Honolulu to any point on the U.S. mainland, it added.

Dedicated facilities at monthly rates will be provided for asynchronous transmission from 75- to 1,200 bit/sec and for X.25 synchronous transmission at speeds up to 9,600 bit/sec, according to Telenet.

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Bell Planning National Net, Microwave System

(Continued from Page 23)

This will eventually interconnect all the new ESSs, enabling them to share call-handling information in high-speed digital form over communications pathways separate from voice circuits, he said.

Some of the new services reportedly will stem from the SPC network's ability to forward a caller's telephone number to the local central office serving the called party.

Some possibilities for new services in the 1980s include:

- Identification of priority callers by means of distinctive ringing for calls from preselected numbers;
- An automatic callback system that would make note of a busy signal, wait until the line was clear and then dial both numbers and connect the two lines; and
- Preselection of telephone numbers from which collect calls could be accepted without operator assistance, according to Bell.

The SPC network will also offer other services designed specifically for business customers, the carrier said.

The Bell System is now implementing the first stage of SPC network evolution for long-distance call handling; and some coast-to-coast calls presently are being routinely set up by CCIS, according to Bell.

Microwave System

Bell also has developed an advanced microwave system that it said will handle three times as many data and voice calls as its current top-capacity long distance radio link.

The technology of the AR6A system will permit more efficient use of the radio frequency spectrum now available for long-distance telecommunications, according to Bell.

The system is being field-tested beginning this summer in Massachusetts. It will be able to carry 6,000 calls per channel, compared to 1,800 for the highest-capacity microwave radio link now used by the Bell System (TH-3), a Bell spokesman noted.

Bell's AR6A will be the first of its kind to use "single sideband" (SSB) technology for high-capacity, long-distance microwave transmission, he said.

SSB reportedly "packs" more telephone conversations into a radio channel without sacrificing transmission quality. As a result, more information can be carried in a frequency band and the frequency spectrum is used more efficiently, Bell claimed.

AR6A will operate at a frequency of 6GHz and will handle both voice and data signals, he said.

Switching Equipment

Like present radio systems, it will incorporate its own protection switching equipment. If a channel should fail, for example, the equipment is capable of automatically sensing this. It can then switch to another channel.

In AR6A, the protection equipment is controlled by microprocessors, Bell added.

AR6A will be field-tested over a 26-mile radio path between Ashburnham and Wendell, Mass. The trial is being conducted by Bell Labs in conjunction with AT&T Long Lines and Western Electric.

This test, which will continue through 1978, and subsequent ones planned on another six-hop radio route through mid-1980, will determine how the system performs under actual operating conditions, the spokesman noted.

AR6A is scheduled for initial commercial service by mid-1980.

By the late 1980s, SSB systems could account for most of the new long-distance route mileage added to the Bell System's microwave radio network, according to Bell.

Terminal Reduces Job Time

(Continued from Page 23)

Because of the number of variables on any job, the lack of proper information could set an entire project off schedule. "Local productivity is always a question and very hard to track against a standard measure because it fluctuates from area to area. So you could be well ahead of a project somewhere and, given the same manpower, far behind in another," Fronk said.

'No Surprises'

To speed up the data cycle and decrease the number of errors that always crept into the system, Litwin examined two alternatives: local service bureaus and the Hewlett-Packard Co. HP 9830 calculator.

"But communications was the answer. We wanted information at the home office faster and we didn't want to relinquish control of the network because our locations are much too remote to rely on somebody else if something went wrong," Fronk recalled.

The only alternative remaining was a communications terminal and Litwin needed a data entry device capable of binary synchronous communications to recheck transmitted data and capable of emulating IBM's Hasp 360/20 workstation, Fronk said.

In addition, since most of the progress reporting programs had been written, documented and tested, Litwin needed a machine that could easily adapt to software changes.

The petroleum facilities construction firm chose the Data 100 device because of past experience with the company. Litwin has had a Data 100 Model 74 for three years which has been out of commission only twice, according to Fronk.

And Litwin has only made one call to Data 100 on the Model 77 here — because of an electrical power surge — even though the terminal sat at a warehouse in Fairbanks where it had blasts of warm and very cold air from warehouse doors being opened and closed, Fronk recalled.

Data Entry

Now data, including payroll information on local laborers and data on man and machine hours billed against different line items, is entered daily by an operator in North Pole on the system's 256-char. CRT.

The terminal performs table look-ups; range checks, batch balancing and any number of other edits and checks — all functions that were programmed by Fronk and his staff.

"With these intelligent features, we know the data is virtually error-free when we send it down the line," he explained. "There aren't any surprises three weeks later as there used to be."

Once collected on diskette, the data is transmitted at 2,000 bit/sec on Saturdays to Kansas City over Glacial States Telephone and then RCA Globcom lines — a process that takes three to four hours and costs $61 an hour or "about $1 per page," Fronk said.

In Kansas City, it is processed by United Computing System's Control Data Corp. Cyber 175 computer system.

By 8 a.m. the following Monday, the data has been processed and the appropriate data printed on the company's 62 line/min printer here at North Pole.

At the same time, the construction progress and piping reports are also printed out in Houston for headquarters personnel, Fronk noted.

Line Problems

Fronk said Litwin has had line problems at the Alaskan end of the communications network. Glacial States' attitude is that if the lines work properly four out of five times used, then it is good enough for data, he said.

Fronk chose a synchronous terminal over an asynchronous device because of the phone problems and "we haven't had the problems other users there have had.

"The others all said they have horrendous problems trying to communicate with the 'Lower 48,' but they are all using low-speed asynchronous terminals," Fronk said.

"With those low-speed terminals, if you get a hit on the line, it's tough luck and try again," he added.

With the reports being on schedule, and with communications problems at a minimum, Litwin has finished the project at North Pole three weeks ahead of schedule, Fronk said. All things considered, the terminal has ensured that neither Litwin nor its clients were left out in the cold.

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Ann Arbor Terminal Controller Allows Single-Line Addressing

ANN ARBOR, Mich. — The Ann Arbor Terminals, Inc. model R2050R CRT controller reportedly permits multiple read-unly displays to be remotely addressed and written over a single communications line.

The controller is intended for industrial and business system applications where multiple CRTs are needed. The unit is said tu reduce system costs by eliminating the need for multiple CRT electronics and multiple computer-to-CRT interface cards.

Four display channels can be driven from une controller and up to 16 controllers can be plugged into one. interface card, a company spokeswuman explained.

The unit displays 20 lines at a density of 50 char./line. Characters are upper and luwer-case Ascii written in 7 by 9 dut matrices.

The unit comes with an RS-232 interface. RS-232 input is regenerated within the unit and output through an auxiliary data connector to drive the next unit in line, she explained..

A "dip switch" on the controller allows the setting of both the unit address and transmission speeds from 110- to 9,600 bit/sec.

Options for the R2050R CRT controller include a fifth video connector and select option, character accent and current loop interfaces.

Prices for the controller begin at $1,095, which includes one display channel. Other prices depend on the number of display channels needed and options ordered, the company said from 6107 Jackson Road, Ann Arbor, Mich. 48103.

Megadata Broadens Line With Stand-Alone CRT

BOHEMIA, N.Y. — The MC77 terminal from Megadata Corp. has been developed fur applications requiring CRTs performing intelligent stand-alone functions with storage requirements of 4K words.

The terminal has a keyboard with up to 84 alphanumeric and function keys and a 12-in. diagonal display.. It can transmit data at speeds from 50 to 38,400 bit/sec in serial mode and 10,000 char./sec in parallel mude, according to Megadata.

The terminal is suited for installations where large numbers of terminals are required, including data entry systems, multidrop communications networks and data transaction systems, the company noted.

The MC 77 is available as a programmable read-only memury (Prom) firmware preprogrammed device, supporting up to 3K of internal program, 1K of program storage and 4K of internal data storage. An unabridged series of computer interfaces is available for it, Megadata said.

The MC 77 can be used as a stand-alone device or up to eight terminals can be clustered and interfaced to one data port.

Prices for the MC77 range frum $1,950 to $2,950 depending on options and quantities needed, the spokesman noted frum 35 Orville Drive, Bohemia, N.Y. 11716.

Soroc Drops Price On IQ 120 CRT

ANAHEIM, Calif. — Soroc Technology, Inc. has reduced prices on its IQ 120 CRT/-keyboard terminal.

The price for end users has dropped $255, bringing the cost of each terminal to $995, according to Soroc, which added quantity pricing has also been reduced.

The cumpany said it is developing "more sophisticated" terminal equipment, scheduled for introduction later this year.

Soroc can be reached at 165 Freedom Ave., Anaheim, Calif. 92801.

USD Has ASR 33 Adapter

PHOENIX, Ariz. — United Data Services Co., Inc. (UDS) has introduced an auxiliary equipment adapter for use with Model 33 Teletype Corp. terminals.

Designed to facilitate expanding the capabilities of computer console teleprinters, and remote time-sharing terminals, the adapter provides the Teletype with an auxiliary I/O port which permits the device to function as an integral part of the teleprinter system, UDS explained.

The auxiliary adapter makes it possible to add a disk/-tape cassette unit, X-Y plotter, punched card reader or other auxiliary terminal device to a Model 33 Teletype.

The on-line communications mode is determined by the external signal line wiring and the auxiliary device is placed in the local loop with the keyboard, typing unit, etc. for off-line preparation or transcribing of data in the Teletype "local" mode, UDS stated.

The auxiliary equipment interface of the adapter directly accepts equipment with standard RS-232 electrical interfacing or, when equipped with an appropriate interconnecting cable, can be used to drive a 20mA. current loop interface, the company added.

Installation reportedly requires nu drilling, soldering or wiring modifications.

The adapter is priced at $110 from UDS at 3024 N. 33rd Drive, Phoenix, Ariz. 85017.

Threshold Has T500 Tester

SAN MATEO, Calit. — Threshold Technology, Inc. has introduced a portable diagnostic test system that it said permits users of its T500 voice data entry terminal to test and repair the terminals on-site at work locations.

The T500 diagnostic system is a briefcase-sized unit that allows immediate field analysis of any fault down to the circuit board level, Threshold claimed.

It must be used in combination with the 4520 interface board, an option now available for all T500 terminals.

The diagnostic system consists of a numeric keypad, an alphanumeric display and a cassette tape unit. The cassette tapes supplied with the system contain digital data needed for diagnostic comparisons and also provide audio instructions to lead the user through sequential test steps, the company noted.

The system also contains port monitors which enable on-line tests to determine if the proper communications signals are being transmitted between the T500 terminal and the user's host CPU. They also test the interaction of the terminal itself with its own operator display and local console; it stated.

The diagnostic device costs $3,000, according to the company, which can be reached through P.O. Box 5332, San Mateo, Calif. 94404.

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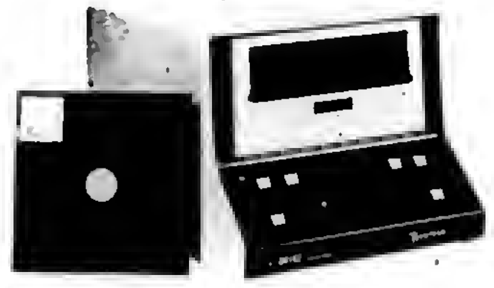

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Form Design 'Crucial'

State Saves $12,000/Mo With OCR Units

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Minnesota's Department of Public Welfare saves about $12,819 a month by using optical character reader (OCR) equipment rather than direct key-to-tape-or-disk machinery to process its medicaid assistance payments, attendees at the recent OCR Users Association conference learned here.

If the department were to go to key-to-tape or key-to-disk equipment to satisfy its data entry needs, 17 additional keystations would have to be acquired to supplement the nine already in operation, according to Robert G. Meyer, administrative assistant with the department's Bureau of Income Maintenance.

"We'd also have to run extra shifts," he added.

The public welfare department went to OCR equipment when the state's legislature decreed that too much money was being spent by the government to pay bills — including medicaid claims filed by such providers of care as physicians, dentists and pharmacies, Meyer explained.

"OCR helps reduce administrative costs so the problem of processing these claims is not as large as it could be," he said, acknowledging that these costs — as with all expenses associated with medical services — continue to be high.

OCR-Readable Forms

Because this data entry technology provides a savings, however, the department of Public Welfare has taken the stand that it must process forms that are OCR-readable. It has done so despite opposition from the providers of care who initially went directly to the state legislature to demand uniform forms, Meyer stated.

The department's willingness to adapt forms and/or the system to permit the use of its Recognition Equipment Inc. (REI) OCR machinery has served to mollify these original objections, he added.

Operational in 1974, Minnesota's system for processing Medicaid claims was one of the first to be federally approved, and thereby eligible for federal funds under the U.S. Department of Health, Education and Welfare Medicaid management Information Systems (MMIS) program, Meyer said.

The state's Bureau of Income Maintenance, which administers the claims payment program through its Medical Assistance Division, uses REI's Input 80 Model C system with nine Total Data Entry (TDE) stations attached to it. Processing power for the program comes from three IBM 370/158s, courtesy of Minnesota's Department of Administration, he noted.

The TDE stations scan the claims forms once. Any errors are corrected manually on a CRT and entered onto the same tape for processing, Meyer continued.

The system includes the ability to send a statement to the medicaid beneficiary to explain what services have been paid for under the federal program, he said.

"We did benchmark OCR equipment in the beginning," Meyer stated. "REI proved to be best at that time at handling our needs."

The equipment can handle almot any font available, reading character by character, he added.

Minnesota's MMIS processed 560,681 forms in the first quarter of 1977. Its OCR equipment read those forms with a 90% accuracy rate, Meyer said.

The providers themselves, however, are the key to any successful medical claims processing system, he stated.

"Most people can't figure out how we got our physicians, dentists and other providers to type their claims," Meyer laughed, noting that OCR systems are much better at reading typed rather than handwritten forms.

"We told the 10,000 providers on the system that they didn't have to type their claims — but added that if they didn't, we couldn't guarantee when they would receive payment," he explained.

Today, 90% of the claims the state receives on paper can be read by the OCR scanners, Meyer said. Providers receive payment in an average of 19 to 20 days.

Few of the state's medicaid service pro-

(Continued on Page 32)

Century to Criterion Conversion Accomplished in Three Weeks

DENVER — "The cost for converting from one mainframe CPU to another can often equal two years of lease expense for the hardware. We did the job, and with no modifications, in just three weeks. During my 16 years in the DP industry, I've gone through seven conversions and this was by far the easiest," according to John L. St. John.

St. John is the director of Management Information Services for St. Anthony Hospital Systems here. He was describing the hospital's upgrade from a 64K byte NCR Corp. Century 200 CPU to a 256K byte NCR Criterion 8570.

The conversion entailed coupling the old and new CPUs, copying existing programs from the 30M byte disks to the 100 M byte replacements and then uncoupling the CPUs. No parallel operation was required and no programs were written.

Because the Criterion is eight times faster than the Century it replaced, St. John said that throughput has been improved 50% to 60%, depending upon the operation. This met the needs for an expanded DP capability while providing time to write modified applications at leisure.

The Criterion's ability to emulate the Century through firmware, enabling the old programs to be converted for the Criterion's use, was a significant feature, according to St. John. He noted that the hospital's latest addition can also function as a Cobol virtual machine and can compile Fortran, Neat 3, RPG and Basic.

The hospital is leasing its Criterion system for several thousand dollars a month less than it would have had to pay for doubling the size of the predecessor Century 200. This hardware economy was a central factor in St. Anthony's installation of the Criterion, St. John noted.

With the knowledge that the Century lease was due to expire in Sept. 1976, the hospital considered it appropriate to review its whole approach to DP, according to St. John. Three possibilities were considered:

- Giving up the in-house facility and going with a service bureau.
- Switching to a facilities management contract.

(Continued on Page 32)

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Recognition 'Long Overdue'

'Ideal' DP Auditor Needs Range of Experience

By Jay Allen
Special to CW

Today's DP audit function is just beginning to receive the attention, budgetary considerations and recognition that is long overdue. It is not surprising to find a tremendous diversity of opinion, thinking and approaches as to the qualifications, role and function of the auditor.

A composite profile of what would appear to make up the "ideal professional" in the DP audit field would be a person around age 31 holding a Masters Degree in Business Administration. The person should be the holder of one or more certificates (CPA, CIA or CDP), have performed systems analysis/design, some limited programming, internal audit experience and some experience with one of the major CPA firms would be nice.

The auditor should be knowledgeable in hardware, terminals and software. The individual's personality should be outgoing yet tactfully aggressive and the person must work equally well with auditors and DP specialists (a few of whom will consider their systems as their private domain which could do without outsider intrusion). An ability to walk on water is helpful.

The more progressive data center management will see the DP auditor as a friend and ally, who through a strong team effort will improve documentation, standards, security, results and in general create a more reliable DP function.

It has been said that the primary objective of the DP audit function is to insure that the systems integrity within the company operations are adequately safeguarded, thet completely reliable financial information is not being compromised and that generally accepted accounting principals are consistently being applied. Before an effective DP audit program can be established, it must be compatible with the overall corporate audit objectives (which are assumed to exist).

Overall Function

It seems that most general auditors or DP audit managers would define their overall function to include some or all of the following responsibilities:

- Participation as a member on the company DP steering committee on all computer related activities.
- An evaluation program to ascertain the effectiveness of data processing systems and operations, consisting of a review of DP costs, plans and future estimates, a review of procedures and standards within the DP and user organizations and post-operational reviews for operational savings and effectiveness.

This includes asking if the new system fulfills the user needs and if all the older systems are really necessary and cost justified or if they are still being run just to fill file drawers.

- To participate in negotiations between the user organizations and DP organization concerning source allocation and operational budgeting.
- Prepare reports concerning operating differences between the user and the processing facility.
- Review and approve the design enhancements of new or existing systems to insure adequate controls will be included and make recommendations where improvements are noted.
- Perform and review DP systems feasibility studies for possible opportunities for cost reductions.
- To prevent intentional or unintentional mistakes in the handling of mechanized information.
- To insure adherence to management policies and consistent accounting practices.
- To insure that the user has an adequate user manual and understands the output.
- To guarantee that all proper standards and procedures are enforced relative to security of the center, terminals, data files, backup, disaster recovery and data base integrity.

For those companies just beginning to implement the function, it may be most practical to do so in stages.

Phase-In Program

Stage one would be an audit within the current systems environment. During the first phase, the DP audit function should make contributions to the DP environment. The audit function should be familiar with the operations of the DP department and operate effectively at this point.

Stage two would develop a systems assurance package.

This stage of development of computing auditing will provide management with a higher degree of assurance that existing computer systems are functioning within established guidelines.

As the first two stages are being completed, the Audit staff will have time to become more expert in systems and programming. The staff will be well versed in DP auditing knowledge, accounting techniques and DP control procedures.

Stage three would monitor systems on a continual basis. As the state-of-the-art in the computer field rapidly progressed, new DP audit techniques must keep abreast of these new computer systems and techniques.

'Preventive' Auditing

The third stage of DP auditing involves a switch from the traditional "after-the-fact" audit to the review of events prior to their occurrence. This preventive auditing should make a particularly valuable contribution to management. Reaching the level of monitoring systems on a continual basis can be considered a long-term project.

Stage four would involve future development and planning. Future planning will allow the audit function to adjust the direction of the audit function as business conditions dictate.

In my judgment, the newly energing DP audit professional and his corporate management should consider that the organizational structure and level at which DP audit is placed is crucial to its effectiveness. It must be completely independent of DP and at a corporate level in which DP management can not dictate or direct.

A definite movement and detailed planning should go into a comprehensive certification program which would lead to certified DP auditors. This would normally include experience and expertise in systems design/programming, hardware/software knowledge, teleprocessing, cost effectiveness and performance evaluation, security standards, insurance coverage, controls and system verification.

As computer systems and technology become more complex, it may no longer be feasible to assume that the firm's large accounting firm can provide timely expertise to one of the corporation's most valuable assets which is the DP function and all corporate data.

Associations Valuable

It seems important that all DP auditors become active and participate in their local EDP auditors association and if a chapter doesn't exist, guidance is available on starting one and how to become affiliated with the International EDP Auditors Association.

Since it is critical that DP auditors be tactfully aggressive and interface well at every level, it may be important for them to attempt to upgrade that part of their personality through a variety of methods available to us today.

We can encourage major universities to offer broader and more specialized curricula in the field of DP audit.

Today's DP auditors have an opportunity and responsibility to provide leadership and training to the vast internal audit profession as to the ways in which the computer can be easily used as a powerful internal audit tool which can save valuable man hours.

Allen is specialist with EDP Auditors Unlimited in Oklahoma City, Ok. 73112.

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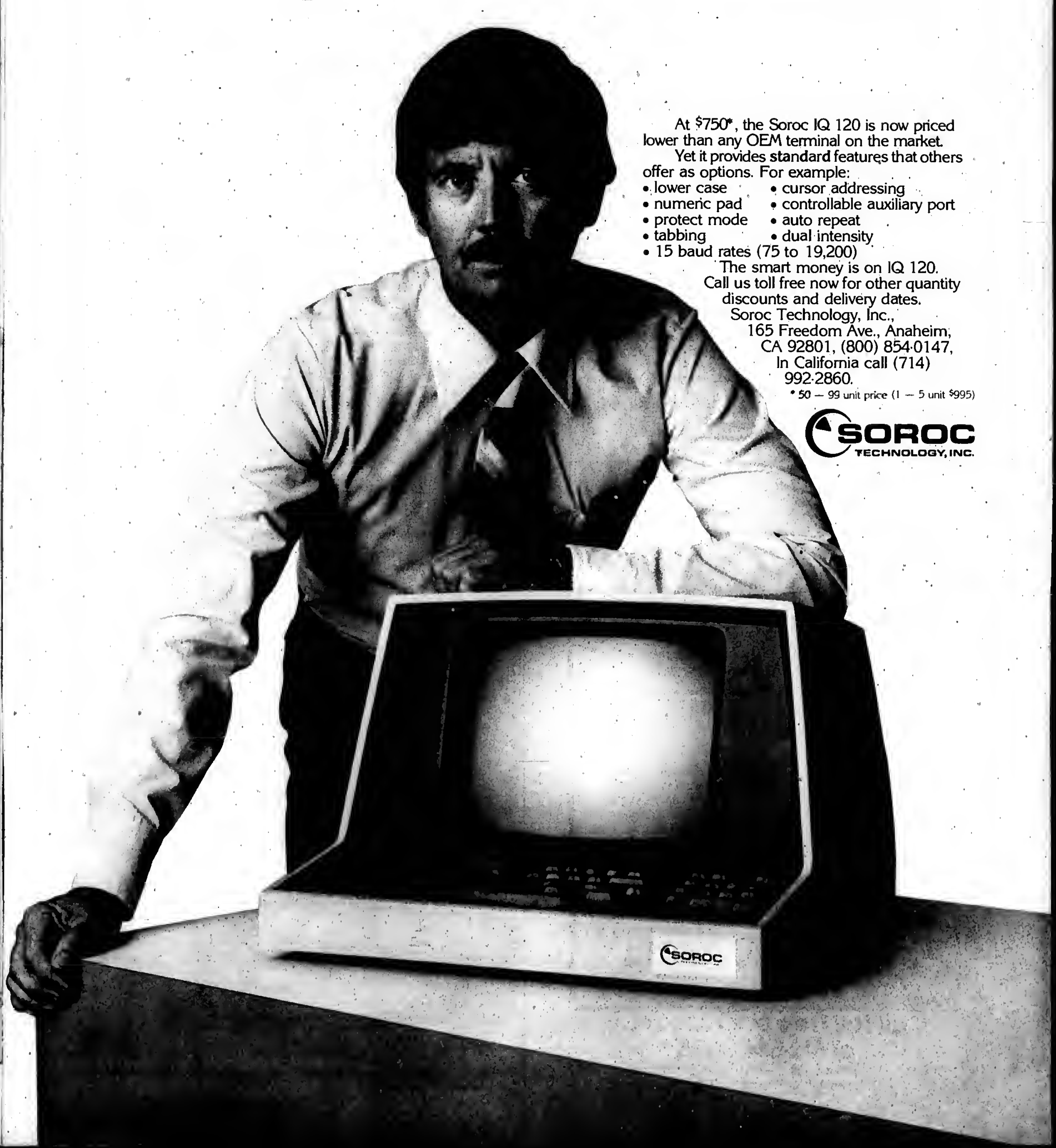

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OCR Units Save Minnesota Over $12,000/Mo

(Continued from Page 29)

viders aren't involved in this scheme of claims payment, he added. One other incentive the system has in its favor is that it handles approximately 30% of the medical care dollars available in the state.

Medical providers don't want ot lose 30% of their cash flow. They would have to turn away all medical assistance recipients if they didn't participate in the claims processing program, Meyer said.

Much of the compromise between the providers and the state's MMIS has been in the area of forms design, he noted:

Minnesota has 15 different claim forms in use now.

Meyer acknowledged the work of other states in the MMIS area. "Michigan's data entry system was the best we saw, and we have borrowed a great deal from their forms design."

Minnesota has begun to depart from pink forms, which drew provider ire on the basis that they are hard to read. Experiments with brown ink indicate the brown forms microfilm better and can be photocopied, according to Meyer.

"We learned that there are so many areas to be considered in forms design that it's impossible to develop the optimum form in one shot," Meyer said.

Forms need to provide adequate space for entry of data elements. In addition, forms should have "integrity" — flowing in such a way that the claim information at the top of a form relates to the information at its end.

Meyer added that the state is now trying to design its forms in such a way that it doesn't ask for every bit of information needed.

"We are striving to find the lowest data form element denominator by which we can derive some of the necessary data from other information supplied on he form," he said.

The "uniform claim" concept — the use of a single form for all third-party payers — is clearly the best direction for further work in the forms area, Meyer suggested.

Uniform forms would facilitate clerk-form familiarity, standardize procedures and collection codes, and minimize provider staff training on how to complete the claims forms, he said.

Meyer's experience in Minnesota in the development of uniform claims forms has not been as good as he would like it to be, however.

In describing his efforts to work with other interested groups, such as the American Hospital Association, on this problem, Meyer stressed the need for cooperation.

He also emphasized the importance of education as to what OCR is. Describing OCR as "a very cost effective means of capturing data," Meyer noted that people working on claim forms usually haven't had experience with OCR.

Century-Criterion Switch Accomplished in 3 Weeks

(Continued from Page 29)

- Upgrading the in-house facility, but with the possibility of switching to another vendor's hardware.

"We knew that our emergency service was going to grow along with the general needs of the hospital. In addition, plans to increase the satellite unit would nearly double the DP needs of the facility," St. John recalled.

"What we were projecting was 20,000 to 22,000 daily computes transactions. That was a year and one-half ago and we've reached that volume today with more growth certain to come," he added.

After weighing the pros and cons, the hospital rejected the service bureau possibility. The feeling, he said, was that while such firms do offer much in the way of health care DP, their approach is, of economic necessity, a standard one.

Thus, there is built-in resistance to change, and that kind of attitude, in addition to being overly confining presents unwanted obstacles to meeting the changing needs of an institution such as St. Anthony. Also vetoed after consideration, St. John said, was the facilities management concept.

"The theory there," he said, "is that you can get rid of your headaches by putting them off on someone else. But in reality, you don't eliminate them, you just remove one step.

"True, the people aren't on your payroll, but that just makes them less responsive. In addition, if an operator is out ill, your processing gets held up just as it would be if you paid the operator's salary directly. The facilities management people can't do any better at hiring a temporary replacement than you can.

"Then too, there's the matter of accountability. A hospital needs a DP center that is completely responsive to its unique requirements. Arguing about those requirements with someone who isn't even on the staff is not only an unnecessarily bruising experience, but one which is generally unproductive," St. John explained.

Since through a process of elimination the hospital had decided to upgrade its in-house facility, the question then became one of deciding which vendor was best. NCR's record of maintenance and service was given consideration, St. John said, but not undue weight, since it was felt that any of three other vendors could prove equally dependable in these respects.

"The hardware of two of the other vendors was simply too expensive in consideration of what we could get for less money with the Criterion. In addition, the cost for conversion to either system was simply out of reason.

"The hardware of the third vendor was quite competitive with the Criterion on a price/performance basis, but again the cost of conversion was too high," he said.

Benita H. Arrellano, a programmer at St. Anthony Hospital, checks out new Criterion 8570 system.

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Via Special CRT/Keyboard

Patients Enter Data Into Hospital's Mini

By Esther Surden
CW Staff

CHICAGO — Patients at Roosevelt Memorial Hospital here enter their own patient histories into a minicomputer-based system via a specially designed CRT, according to Jim Garthwait, director of information for the hospital.

The 144 bed not-for-profit hospital runs a complete patient care system on a 72K Four Phase Systems, Inc. IV/70 minicomputer with eleven CRTs, a 300 line/min printer and two cartridge disks.

After admission, the patient sits down at a terminal and takes his own history. The patient is accompanied by an historian who guides him through the process. A plastic template fits over the keyboad so the patient can only access the 10 numeric keys and two other keys that trigger "next question" and "go back." About 212 questions are asked of the patient, but all of these are asked only if the answers to every question is yes, Garthwait explained.

"Most of the answers to the questions are 'yes,' 'no,' 'I don't know,' or 'I don't understand.' There are a few in which the patient has to give a specific number."

After the patient keys in the information, the historian interviews the patient and asks for information on medicines the patient is currently taking or medicine-related allergies. With this information the historian adds a narrative part to the history. The system then prints out a narrative of the answers the patient gave, which, along with the admitting form, goes into the patient's chart.

Patient History System

The hospital's system of letting the patient "take" his own history began when a group of doctors got together and devised a patient history system on a Digital Equipment Corp. system.

The hospital needed more capability than the DEC equipment could provide and got in touch with a local consulting firm to devise the patient care system, he said.

The system begins to track a patient even before he is physically in the hospital, Garthwait said. Before the patients arrive at the hospital many go through a pre-admission procedure.

When a reservation is received from a doctor an admitting person calls the patient and enters all pertinent information so when the patient comes into the hospital, the record can be recalled, a permanent number provided and the admit date entered.

After the patient history is taken, the patient is put through a battery of lab test. As the technicians in the lab finish the tests, they enter the results on a CRT. As soon as the tests are entered the doctors or nurses have access to them through CRTs on the floor. Hard copies of the test results are printed twice a day, once at 3 p.m.and once before midnight, he said.

An X-ray reporting application is also part of the system, he explained. At Roosevelt, and at many other hospitals, standard narratives are used to describe normal X-rays. The X-ray department at Roosevelt had a typewritten list of about a hundred of the standard narratives, which the DPers have now put on disk.

"That took care of about 40% of the X-ray results that the hospital was reporting," Garthwait explained. The rest are keyed directly into the system.

The day after the patient is admitted, a utilization coordinator receives a report. The coordinator codes the patient's diagnosis into the system, and the system calculates "what the patient's length of stay should be." That triggers a census report for doctors.

When the patient is ready for discharge an admitting clerk enters the final diagnosis and the discharge status. A patient is kept on-line for two weeks, a length of time that is simply a function of system capacity, he noted.

Each night between 11 p.m. and 12 a.m. the hospital's switchboard operator takes the system off its on-line status and switches it to batch to print reports. "One of our design criteria was that the system should operate without DP personnel," Garthwait explained.

Because of the interest generated by the system, the hospital set up a company to market the software called Medical Computer Applications Corp. with which Garthwait is now involved, he added.

DEC MSB-11 Lets Students Use Mark Sense Batch Input

MAYNARD, Mass. — The Mark Sense Batch-11 (MSB-11) from Digital Equipment Corp. is an instructional batch processing system that allows student prepared marked cards, coded in either Basic or Fortran IV, to be used as input.

The PDP-11/04 based system includes 32K bytes of semiconductor memory, dual floppy disk, 180 char./sec line printer, LA 36 Decwriter II console terminal and the CMS-11K desktop mark sense card reader. Basic is included with the system, while Fortran is optional, a spokesman added.

DEC MSB-11

The CMS-11K reader enables the system to accept 40-column punched or marked cards. The system can be expanded to full RT-11 capability which allows it to run multi-user Basic in a timesharing environment alternately with mark sense batch, the company noted.

In addition, current PDP-11/34 users, who have floppy disk storage can add the stand-alone mark sense batch capability through the introduction of a system enhancement package.

The system, with a subset of the RT-11 operating system costs $21,460. With the replacement of the desktop reader with DEC's standard CM-11 card reader the system costs $25,260, according to a spokesman. DEC is located in Maynard, Mass. 01754.

IBM Peripherals Linked to Minis

HOUSTON, Texas — Information Products Systems, Inc. has a device it says allows high performance IBM peripherals to hook up to a medium scale minicomputer.

Called the Selector Channel Emulation Unit (SCEU), it generates the protocol sequences required by the IBM peripheral control unit in response to the operational commands of the minicomputer CPU.

The unit can support up to 255 different device control units at combined transmission rates in excess of 2.4M byte/sec, the company claimed.

A typical system configuration includes a minicomputer, general purpose interface SCEU, Selector channel bus, IBM device control unit and the IBM or IBM-compatible device. The SCEU costs $15,150 with discounts available. The company is located at 6565 Rookin, Houston, Texas 77074.

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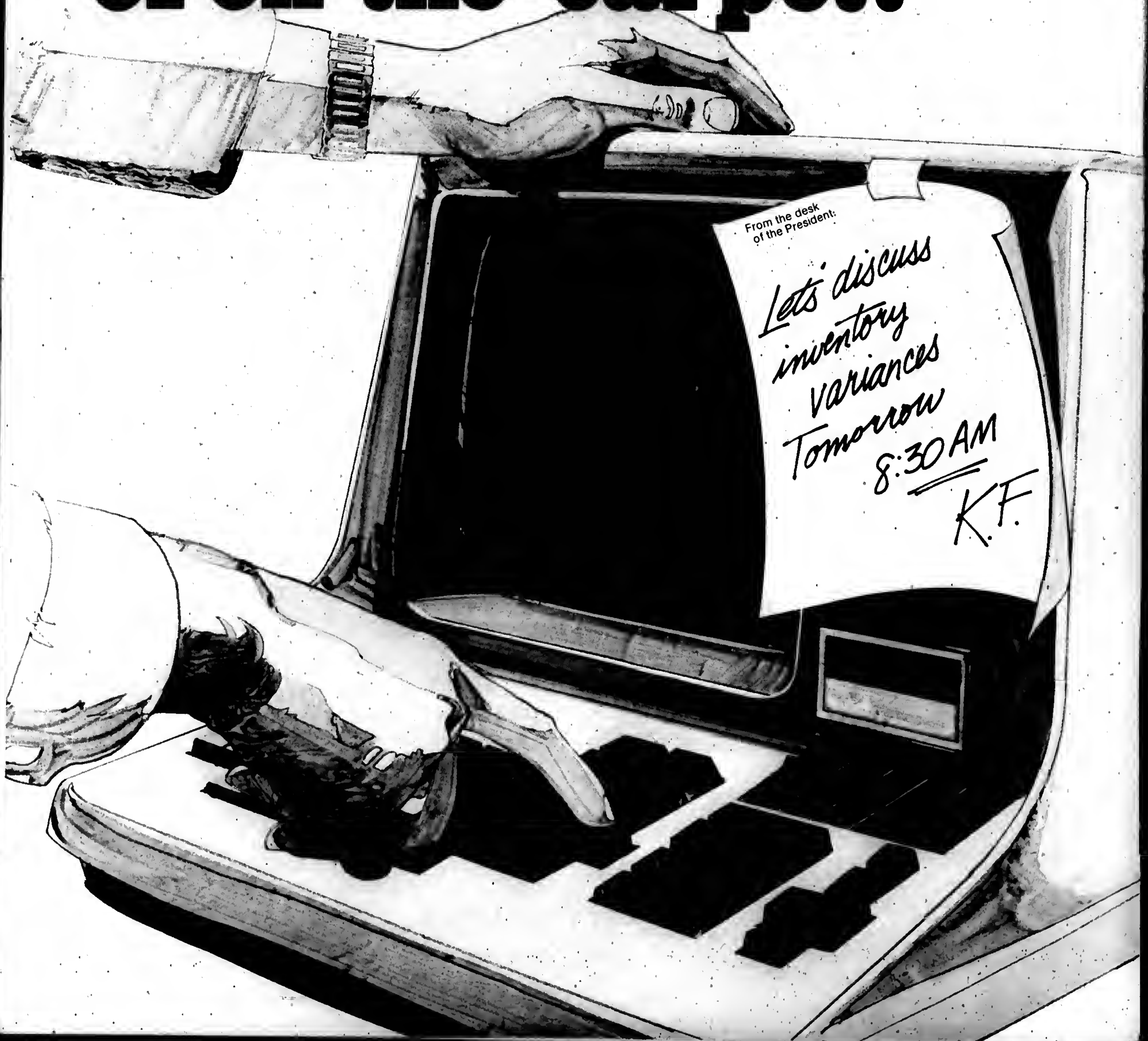
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Large databases can be managed with ease since on-line disk capacity can be as large as 2.4 billion bytes; main memory as large as 8 million bytes.

Typical systems for database management applications range from $100,000 to $350,000, or about $2,170 to $7,600 per month if leased directly from Prime.

To find out how being on-line to a Prime computer can keep you off the carpet, talk to Robert P. Berkowitz, vice president of manufacturing, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701, (617) 879-2960.

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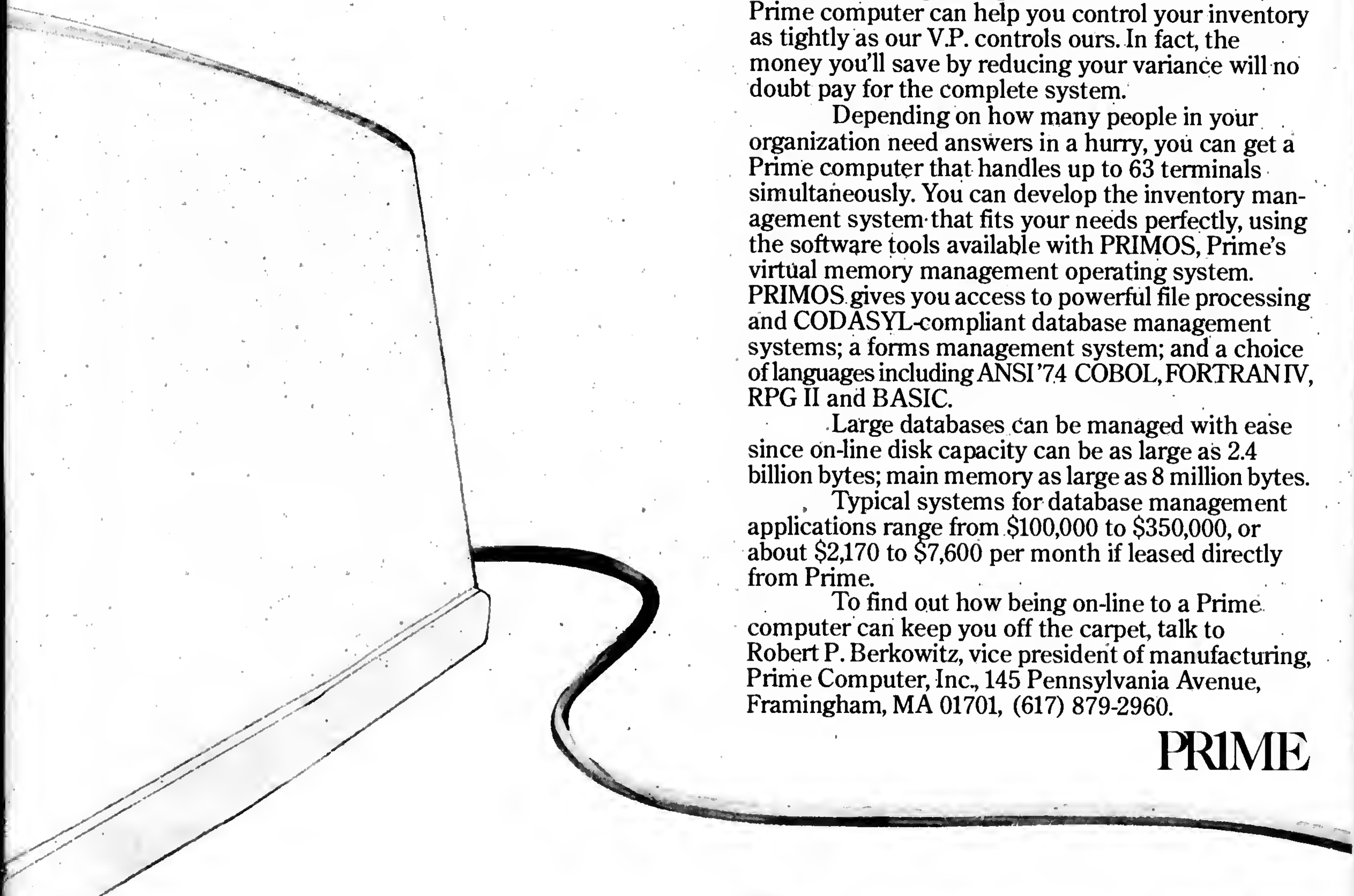

Prime can help

Datapro Offers Selection Course

DELRAN, N.J. — A course in selection and usage guidelines for minicomputers and microcomputers will be given in four cities this fall and winter by Datapro Research Corp.

The course is intended for people with systems or administrative responsibility for planning and designing business information systems. Anyone responsible for evaluating, specifying, buying or using minicomputers and microcomputers will benefit from taking the course, Datapro said.

Included will be evaluation guidelines and competitive comparisons of existing vendors' product lines and business methods, the company said, as well as discussions of the relative value of vendor features and system integration capabilities.

The course costs $425 for current Datapro subscribers and $475 for nonsubscribers and will be given in Chicago Sept. 29-30, New York Oct. 13-14, San Francisco Nov. 17-18 and Washington, D.C. Dec. 12-13. Information is available from Peggy Quinn, Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

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Digital Pathways Eprom Fits DEC PDP-11 Minis

PALO ALTO, Calif. — Digital Pathways, Inc.'s RMP-116 board, designed for the Digital Equipment Corp. PDP-11, holds up to 16K of read-only memory (ROM) and contains an on-board programmer, according to a spokesman.

The device is said to allow users to place large programs in read-only memory, replacing disks for this function, thus enhancing speed and reliability.

The system is based on the Intel 2716 UV erasable programmable ROM (Eprom) or its masked equivalent 2316 ROM. It can plug directly into a peripheral slot on the PDP-11.

The unit accommodates direct and indirect addressing modes. In direct mode, memory is organized as a set of four blocks containing 4K words. Any block or combination of blocks can be assigned to unused portions of the PDP-11 address space, the company explained.

In indirect mode, all words on the board can be individually or sequentially accessed through a common port having a single peripheral address.

The RMP-116 board and programmer costs $895 and ROM chips are available from various suppliers, a spokesman added from Digital Pathways, Inc., 4151 Middlefield Road, Palo Alto, Calif. 94306.

Turnkey Suits Fuel Dealers

SCOTIA, N.Y. — A minicomputer-based turnkey system for fuel dealers is available from Mohawk Computer Technology, Inc. (MCT).

The on-line, interactive Fuelnova system was designed for fuel dealers with any number of accounts, the firm said. The system is modular and is configured to each dealer's needs.

It can handle transactions for payments, charges and no charges, as well as schedule deliveries using any one or combination of three alternatives with credit-checking capabilities, the firm said.

Management reports covering aged trial balances, sales analysis, budgets and performance can be produced by the system, according to MCT.

The Fuelnova system is comprised of a Data General Corp. Nova 3 CPU with 32K words of memory; a 60 char./sec serial matrix printer; a 10M-byte Novadisk with 5M bytes of fixed and 5M bytes of removable storage; and one or more CRTs.

Prices for a typical system range from $32,000 with one CRT to $36,000 with three CRTs. MCT is located at 8 Sarnowski Drive, Scotia, N.Y. 12302.

Add-On Gives Up to 32K Bytes

MINNEAPOLIS — Fabri-Tek, Inc. has a semiconductor add-on memory for the Digital Equipment Corp. LSI-11 and PDP-11/03 minicomputers.

The LS-IN-11 is said to provide 8, 16, 24 or 32K bytes of memory on a single card using 8K or 16K dynamic metal oxide semiconductor N-channel chips.

The unit uses a two-wide connector and plugs into a single chassis slot position. It is hardware- and software-compatible with the mini and memory segments are switch-selectable.

A 16K add-in memory costs $1,085 from the firm at 5901 S. County Road 18, Minneapolis, Minn. 55436.

Computer Labs Has Mag Tape

GREENSBORO, N.C. — Computer Labs, Inc. has a magnetic tape memory system for the Digital Equipment Corp. PDP-11 minicomputer. Called the T9000, the 75-in./sec magnetic tape transport permits PDP-11 system integration without any software changes, the firm claimed.

The 9-track PDP-11-compatible controller is available in either an 800 bit/-in. NRZI version or one incorporating both NRZI and 1600-bit/in. phase-encoded formats. It runs RSX-11, RT-11 and DOS operating systems unaltered and is also TM11/TU10-compatible on commands and status interrupts, it said.

The 800 bit/in. T9000 costs $8,350 from 505 Edwardia Drive, Greensboro, N.C. 27409.

LSI-11 Gets Eprom Board

BELTSVILLE, Md.— RDA, Inc.'s RMRV-8K is an 8K-word erasable programmable read-only memory (Eprom) board designed for use with the Digital Equipment Corp. LSI-11, according to a spokesman.

The memory board occupies one dual-height module slot in the LSI-11 backplane, he noted. Addressing is jumper-selectable for any two 4K banks in the zero to 28K address space, he added.

The RMRV-8K costs $285, depopulated, from the firm at 5012 Herzel Place, Beltsville, Md. 20705.

Mini Bits

DG User Group Sets Fall Meet

WESTBOROUGH, Mass.— Data General Corp. has announced its plans for its annual users group meeting.

The meeting will take place in San Francisco on Oct. 26-28. Users can choose from concurrent seminars dealing with communications, languages and hardware as well as application case histories.

DG users with questions or suggestions concerning the meeting are urged to contact John Maloney, Data General Users Group, 15 Turnpike Road, Westborough, Mass. 01851.

Distributed DP Course Set

NEW YORK — A course on distributed DP using minicomputers and data bases will be given by Advanced Management Research International, Inc. in Boston on Oct. 3-5 and in San Francisco on Oct. 26-28, a spokesman reported.

Designed for DP managers, systems analysts and corporate management concerned with or responsible for developing the DP services within their organizations, the course will attempt to provide users with "what you need to know" to make decisions.

The course costs $495 for an individual registrant and the group rate for two or more persons is $425. AMR can be reached at 1370 Ave. of the Americas, New York, N.Y. 10019.

TI Cuts 900 Series Prices

HOUSTON — Texas Instruments, Inc. (TI) announced maintenance price reductions across all product lines of its 900 series mini/microcomputers and systems, effective Aug. 1.

Maintenance price reductions averaged 22% for the 990 family and 20% for the 900 series.

TI's Digital Systems Division can be reached through M/S 784, P.O. Box 1444, Houston, Texas 77001.

Seminar to Cover Minis In Health Care Settings

NATICK, Mass. — International Management Services, Inc. will present a seminar on minicomputers for health care applications in Boston on Oct. 26-28.

The seminar will strive to present a basis of comparison for evaluation of various products and techniques. Firm guidelines will be given for the evaluation and management steps will be recommended for analysis, design, selection and installation of minicomputers.

The seminar costs $395 for each prepaid attendee and $445 for billed attendance. Additional people from the same organization can attend the seminar for $425, IMS explained from 215 Oak St., Natick, Mass. 01760.

Correction

English 210, an option available on STC Systems, Inc.'s Ultimacc business system [CW, Aug. 15, Page 33], costs $5,000 to purchasers of that system. It is included as a standard part of the firm's Wholesale Distributor package in the bundled price which starts at about $43,000 including hardware and software, according to a spokesman.

A Source of Micro Bugs

'Noisy' Electricity May Plague Hobbyists

By Michael E. Zeidler
Special to CW

MILWAUKEE, Wis. — Many microcomputer hobbyists are discounting the quality of residential electricity as a source of computer "bugs." Purity is being ascribed to the electricity that is fed to the micro, but this confidence by hobbyists is not justified.

Transients in the electrical power supply are responsible for many mysterious microcomputer bugs.

Quite likely, each of the over 25,000 hobby micros in the country have been tripped into electricity by "noisy" electricity. Many of these errors, being non-repeatable, are getting chalked up and forgotten.

Some of these microcomputer bugs can be directly traced to transients in electrical power supply lines. Loading failures, media-to media transfer errors, memory loss and other 'glitches" may be symptomatic of power quality problems. These transients, which cause the quality of electricity to deteriorate, are introduced by competing appliances, neighborhood users and district surges.

The first time a hobbyist suspects power quality problems may occur when the microcomputer is competing with a dish washer, washing machine or power tool for electricity.

The micro might behave erratically and might refuse to load a tape or might jump to a different routine. The problem will clear up when the competing appliance is in the middle of a cycle and then reappear anew during the next cycle switching.

Transients are also related to neighborhood usage characteristics. A typical pole transformer usually supplies several buildings, some of which might contain heavy equipment which pollutes the electricity with spikes. The problem may be compounded by an insufficient rating on neighborhood pole transformers.

Microcomputers are also affected by brown-outs during periods of peak usage. During a brown-out a utility cuts voltage levels by 5% to head off a black-out.

Since the speed of the clock in the micro is a mathematical function of the input voltage, the clock may slow down during a brown-out, which could cause problems such as I/O transfer errors.

The hobbyist has little or no control over the quality of the electricity that is being consumed by the microcomputer. There is no control over the brown-outs and transients introduced into the neighborhood electrical supply. The hobbyists' control is limited to non-automatic appliances in the hobbyist's residence.

The hobbyist must adopt a defensive strategy to assure reliable microcomputing.The enthusiast can take six preventative steps:

- Recognize the possiblity of harmful transients in the residential power supply.
- Avoid competition between the microcomputer and domestic appliances.
- Avoid computing during peak demand periods or during brown-outs.
- Select large system power supplies.
- Use voltage spike protectors and isolation transformers.
- Identify the source of local transients.

Defensive action will help to minimize the impact of power quality problems.

Ziedler is an independent computing consultant and may be contacted at 2854 North Cramer St., Milwaukee, Wis: 53211.

Micro Bytes

'Shacks' to Retail 8080A Chip

FORT WORTH, Texas — Radio Shack Co. has announced that it will be retailing an 8080A microprocessor unit chip in its stores.

The chip comes housed in a standard 40-pin dual-in-line package and sells for $17.95, the spokesman said.

Heath Offers Catalogue

BENTON HARBOR, Mich. — The latest edition of the Heath Co. catalogue lists 400 electronics projects and features the Heath H8 and H11 microcomputers.

The catalogue is free from the company, Dept. 350-420 at Benton Harbor, Mich. 49022.

EPA Offers Micro Kit

SAN DIEGO — Electronic Product Associates, Inc. (EPA) is offering its Micro-68 computer in kit form at $385 complete with power supply and cabinet.

The kit includes a 6800 microprocessor, 16-key hexidecimal keyboard and six-digit display.

Memory can be expanded from the 128 words of random-access memory included to 768 words.

The MON-1 keyboard operating system is supplied in programmable read-only memory form.

EPA is at 1157 Vega St., San Diego, Calif. 92110.

Kit Has Basic

HIRAM, Ohio — Ohio Scientific has introduced the Challenger IIP, a 6502-based microcomputer that comes complete with Basic.

Challenger IIP comes with keyboard and interface to connect to a CRT.

The unit, with 4-slot backplane and case costs $598 from the firm in Hiram, Ohio. 44234.

Starting A Store

BOSTON — Consumer Computer Marketing, Inc. (CCM) has released a report, "How to Start a Computer Store and Keep it Running.

The package includes a 175-page manual and features an audio cassette transcription of the three-hour session presented at this year's National Computer Conference by Paul Conover, a consultant with CCM.

The report sells for $200 from the Audio Visual Dept., CCM Inc., P.O. Box 7343, Oakland, Calif. 94601.

PCC Offers Reference Book On Personal, Home Computing

By Frank Vaughan
CW Staff

MENLO PARK, Calif. — The People's Computer Co. (PCC) has recently published "PCC's Reference Book of Personal and Home Computing."

The volume contains 10 articles dealing with personal and home computing .The subjects range from a simple glossary that is subtitled "How to Translate Computer People Talk into Near-English;" an overview of personal and hobby computing; a discussion of languages; version three of Palo Alto Tiny Basic and the future of personal computers.

In his preface to the first article, "An Elementary Introduction to Home Computers for the Complete and Absolute Novice" Dwight McCabe, editor, says:

"The computer world can seem like a very strange and forbidding place to the non-initiate who unexpectedly stumbles across it. Computer people seem to enjoy adding to this aura by using an intricate jargon that often seems more related to Hungarian or Urdu than to English. In the past, an introduction to computers for most people resembled being grabbed by the neck and belt and being thrown bodily into a pool. After a period of complete confusion and even despair, everything usually clicked and made sense. Sadly, some drowned."

In the reference portion of the volume, McCabe provides two bibliographies, one general and one on computer music. He also includes membership information on the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers, Inc. (IEEE).

In addition, over 200 U.S. and foreign computer clubs are listed along with the club newsletters. Information on hobbyist publications, stores and companies is also included.

The reference book costs $5.95 plus 95¢ for shipping and handling per book. California residents must add 35¢ for sales tax. PCC, 1263 El Camino Real, P.O. Box E, Menlo Park, Calif. 94025, is a chartered, non-profit organization which also publishes three magazines: Dr. Dobb's Journal of Computer Calisthenics and Orthodontia, People's Computers and Computer Music Journal.

ACM Plans Hobbyist Group

NEW YORK — The Association for Computing Machinery (ACM) has formed a special interest group on personal computing (SIGPC). It will be operated exclusively for educational and scientific purposes in the design and applications of computer systems for personal uses, according to a spokesman.

Dr. Portia Isaacson, who chaired the 1977 National Computer Conference, has been appointed chairperson of SIGPC. Isaacson's immediate plans include appointment of other officers, publication of a quarterly newsletter and holding SIGPC's first business meeting at ACM '77 in Seattle Oct. 17-19.

Persons interested in joining SIGPC should write to ACM at P.O. Box 12105, Church St. Station, New York, N.Y. 10249. The dues, which include a subscription to the newsletter, are $5/yr for members, associates and student members of ACM; $13/yr for non-ACM members and a newsletter subscription without membership costs $12/yr.

Further information on SIGPC programs may be obtained from The Micro Store, 634 South Central Expressway, Richardson, Texas. 75080.

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Axiom Plotter/Printer Bows

GLENDALE, Calif. — A graphic plotter/printer designed to operate on microprocessor based systems is available from Axiom Corp.

The Axiom EX-810 is a full graphics plotter which can print 8,192 dot/sec with up to 512 dot/row. It can function as an 80 column alphanumeric printer with a speed of 160 char./sec.

The unit is intended to be driven by an 8-bit MPU with relatively minimum software overhead and it is equipped with a TTL compatible controller which takes care of all the internal timing functions necessary to drive the printhead and advance the paper, the spokesman added.

Printout is initiated by a single input command which causes the eight-track non-impact printhead to move across the printing field, he said.

The unit costs $795, is self-contained in a case with power supply, paper holder, low power detector and bell. It uses 5-in. wide electrosensitive paper, the spokesman noted from 5932 San Fernando Road., Glendale, Calif. 91202.

N.Y. Hobby Show Planned

NEW YORK — A microcomputing trade and hobby show is scheduled for Oct. 28-30 at the Coliseum here.

Speakers and experts to fill the seminar agenda are being provided by "Byte," the small systems journal. Topics will include items of interest for persons who range from the novice to advanced levels of microcomputing, according to Manfred Peschke, publisher of "Byte."

Manufacturers have, he said, been invited to explain their microcomputer systems along with the experts who will conduct forums on algorithms, software, language compilers and assemblers.

The personal design of microcomputers, kit building and applications are among the topics to be included.

Three-day tickets cost $13, two-day tickets sell for $9 and a one-day admission will cost $5. The show is being produced by H.A. Bruno & Associates, 78 East 56th St., New York, N.Y. 10022.

AJ Set to Sell Used Terminals

SAN JOSE, Calif. — Anderson-Jacobson, Inc., is offering a refurbished terminal at one-fourth its original cost.

Offered is the AJ 841, an IBM Selectric-type terminal and off-line typewriter that originally sold for over $4,000, according to a spokesman.

The terminal is being sold at an introductory price of $995 plus shipping. It will regularly sell for $1,195 from Steve Trillo at the firm's 521 Chariot Ave. office, San Jose, Calif. 95131.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Sought Countermeasures

IBM Feared Competition to 360/30 CPU

By Molly Upton
CW Staff

NEW YORK — In 1964 IBM's System 360/Compatibility Committee foresaw competition from independent manufacturers' peripheral equipment and considered likely the appearance of a 360/30 compatible CPU, according to a committee memo on Aug. 21.

The report considered integrating various devices and tying in programs with read only memory as ways of countering possible competition.

The committee found that the 370/30 market presented the greatest potential for a competitive compatible system, according to the memo which was introduced as evidence in the U.S. vs. IBM antitrust trial here.

"A 'super' Model 30, completely compatible, with a price/peformance superior to the Model 30 may be announced by a competitor in late 1965 or 1966," the report continued.

IBM saw competition in the peripheral area coming from both independents and divisions of computer manufacturers, both of whom "are in a position to market devices of comparable IBM capacities at approximately 20% less price," according to the report.

In addition, these firms were likely to heavily market these peripherals to the federal government, IBM indicated.

IBM thought the competition would be in the areas of tape drives and terminals.

The report estimated there would be about 14,600 installed 360/30s by 1970, far more than any other 360 model.

Any direct competitor of the 360 line would have to use integrated circuits, the committee indicated, and it might be "possible to 'leapfrog' IBM because integrated circuitry will be available in the time period under consideration."

The competitive task force saw a problem in motivating engineers to directly copy a machine. "The job of directing engineers to slavishly copy a system when they can see many ways to make improvements on it is a formidable one."

The report considered the possible situations and approaches of three hypothetical firms entering the 360 compatible market and concluded "successful competition to the 360 on a compatibility basis is no easy task."

Among the problems was the question whether the price of integrated circuitry would be low enough by the desired date.

IBM Trial Documents

There were also problems in undercutting IBM's price, IBM speculated. "It appears difficult to provide a system with greater performance and more features than the Mod 30 at such a price and still get a suitable profit."

The most likely solution regarding file compatibility would be to use IBM files.

"This introduces the two vendor problem, a diminishment of the price/performance gained by cheaper competitive I/O, and an additional level of complexity in replacing Mod 30s which run under the operating system or which have file-oriented applications," the report stated.

It would also be a problem to offer an entire range of systems that would compete with IBM's offer of upward and downward mobility, IBM indicated.

And lastly, any potential competitor would have to reckon not only with IBM, but also possibly with other entrants in the same plug compatible CPU market, according to the study.

To Minimize Exposure

To minimize the potential exposure of the Model 30, the committee suggested IBM investigate the following possibilities:

- Programming systems tied in with read only memory.
- Emphasis on 2311 file for 16K programming system support.
- Improved scientific performance of Models 30 and 40,
- 1401 compatibility mode,
- Improved throughput through I/O developments,
- Evaluation of solid logic technology (SLT) vs. integrated circuits.

(Continued on Page 40)

Mini, Micro Peripherals Market Placed at $37 Billion in 1986

By Toni Wiseman
CW Staff

NEW YORK — Minicomputers and microcomputers are predicted to reach a cumulative market of $30 billion by 1985.

By the following year the minicomputer peripherals market will total $37 billion cumulatively, with minicomputer software totaling $3.4 billion over the same decade, according to Frost & Sullivan, Inc. (F&S), a market research firm here.

"Software and peripherals have become the most profitable portions of a minicomputer system," the report stated.

F&S found that there are some 200 independent companies which currently produce miniperipherals in addition to the minicomputer mainframers themselves.

And, competition among the mini manufacturers, independent peripherals companies and software houses is extremely fierce, with all three groups soon to be supplying complete turnkey systems, it said.

The battleground has particular significance to the independent peripheral company, F&S said, because "it will have to incorporate either a minicomputer or microcomputer CPU into its own product line and sell a complete computer system or else be at the mercy of the CPU manufacturer."

This fact might explain Pertec Computer Corp.'s recent acquisition of Mits, Inc., it suggested.

During the next decade, the largest dollar sales will be in alphanumric display terminals, printers and magnetic disks, which together represent over 50% of total miniperipheral dollar sales, the report said:

The alphanumeric display terminal's large sales are due to its use as a major on-line data entry unit which replaces batch processing with transaction type processing, it said. With the trend toward multiple terminals, F&S predicted the number of units sold in 1986 to jump to 2.8 billion units valued at $1.13 billion, compared with 150,000 units valued at $150 million in 1976.

"The floppy disk, and the one-million byte mini disk, have opened computerization to the small businessman and will see annual sales increase from a present $100 million to

(Continued on Page 40)

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IBM Planned to Counter 360/30 Competition

(Continued from Page 39)

Looking at the I/O competition, the committee recommended IBM institute:

- Reviews of all policy and contract changes from marketing as well as financial aspects,
- Development of price/performance improvements in the data storage device area,
- Increased reliability and human factors designed in I/O equipment,
- Study of ideas for integrating devices, programs and possibly, diagnostics so customers will favor IBM terminal devices,
- The continued practice of disclosing interface specifications only after the final specifications test.

Thus in 1964 IBM was thinking of several ways of integrating its systems to thwart competition.

Tying in programming systems with read only memory would make direct replacement of the system more difficult, IBM said.

If the 16K version of the 30 used an operating system via the 2311, this could make replacement inherently more difficult, the committee explained.

And linking users to the 1401 could also thwart users from switching to other machines. This could be done through a one-time charge or free provision of a 1401 compatible mode or a program switch which would allow intermixing of 1401 and 360 programs under an operating system, the report stated.

If substantial inroads were made on the 30 base, a model 25 which had full compatibility, not just subset compatibility, with lower performance and lower price "would retain for IBM many installations exposed by price alone rather than by price/-performance," the task force said.

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The Schedule for the 1977/78 Series is:

September 7, 1977 Newton, Mass.
October 4, 1977 Minneapolis, Minn.
October 27, 1977 Palo Alto, CA.
November 17, 1977 Houston, Texas
January 19, 1978 Orange County, CA
February 2, 1978 Ft. Lauderdale, Fla
March 2, 1978 St. Louis, Mo.
April 4, 1978 Hasbrouck Heights, N.J.
April 6, 1978 Valley Forge, PA

Invitational Computer Conferences

Invitations are available from participating companies or the ICC sponsor. For further information contact B J Johnson & Associates, 2503 Eastbluff Drive, #203, Newport Beach, Calif 92660 (714) 644-6037

Mini Gear Mart Growing

(Continued from Page 39)

$215 million by 1986," the report projected.

Higher capacity magnetic disk cartridge/disk pack sales will increase from $375 million annually to $1.4 billion over the decade, with ten-year sales exceeding $8 billion, F&S stated.

Printer sales will increase from 44,000 units valued at $300 million in 1976 to 280,000 units valued at $1.3 billion in 1986, for a ten-year market of $6.7 billion, the report predicted. The majority of these will continue to be serial printers throughout the decade, though faster (over 600 line/min) printers will begin to gain popularity.

"The add-on memory, which isn't considered a mini-peripheral today, may eventually perform the auxiliary storage function when its cost/performance ratio improves. However, while we see the add-on memory increasing due to user desire to expand present systems, its impact as a major storage medium is not envisioned in the foreseeable future," the report observed.

Add-on sales were projected to grow from 22,000 units valued at $110 million in 1976 to 150,000 units valued at $325 million in 1986. Total sales over the decade should amount to $2.16 billion, the report indicated.

"Software sales for the minicomputer will be basically application program packages for the small businessman who needs to have the computer manufacturer or software house perform programming," F&S said.

Total sales for minicomputer applications packages will exceed $575 million in 1986, reaching a ten-year total of $2.8 billion, it stated.

While system software will have lower sales, it will nonetheless grow from $30 million in 1976 to $75 million in 1986, with a ten-year total of $525 million, the report predicted.

"The minicomputer software market, due to the basic need for customization to each user's requirements, will still be the prime area for the independents.

"No one company, or small group of companies, has the capability to meet the software needs of each possible application and subapplication area.

"The small businessman needs to establish a personal relationship with the vendor. For that reason, the independent company will retain the most significant share of this market," F&S stated.

The study noted that minicomputer manufacturers now regard software as a key computer element, and expect profits on it to make up for low hardware costs. "Software is the wedge they use to differentiate one system from another," it said.

All of this has prompted minicomputer manufacturers to substantially increase software development efforts and to restructure software marketing. The practice of licensing software so that a customer pays monthly payments is spreading throughout the industry in contrast to the previous practice used by computer companies to charge a one-time licensing agreement, according to F&S.

In addition, most companies offer only short warranty periods on the software and do not back up the product against defects over the life of the package.

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Amdahl Stock Swings Up After IBM Announcement

SUNNYVALE, Calif. — The price of Amdahl Corp.'s stock has soared from 30-1/2 on Aug. 3, the day after IBM announced the delivery schedule for its 3033 processor, to 41 on Aug. 24. And it is still climbing.

One analyst noted that Amdahl stock earned $1.70 a share last year, compared with a loss of $6.29 for the previous year. In the first quarter of this year earnings were 69 cents a share compared with 18 cents a share in the year-ago quarter.

"I don't think there's much stopping them in the near future," he declared.

Gene Amdahl, president of the firm, said he attributes the stock's recent upswing in part to the IBM announcement and in part to the fact that security analysts have finished analyzing the firm's second quarter results and feel better about his company's prospects.

Harry Edelson, vice-president of research with Drexel Burnham Lambert, Inc., a brokerage firm, agreed the financial community feels better about recommending Amdahl stock for several reasons.

First, Amdahl will be doubling its manufacturing capabilities in the next six to eight months. "It's had enormous gains with just manufacturing five computers a month. It'll probably go to 12/month within a year and from that you could certainly do some extrapolation," he said.

Amdahl has also been able to hold its margins level after the 3033 was announced, Edelson noted.

Manufacturing Source

In addition, Amdahl now has an alternative manufacturing source — itself — which means it no longer relies solely on Fujitsu Ltd., which spread the risk thinner, Edelson said. And, where it used to have to carry a lot of spare parts inventory and three or four people for each installation, it is now able to save on these areas as more systems are sold, he added.

Finally, Amdahl plans to start building computers in Ireland. This will ameliorate its tax rate since it will have a favorable tax position there for a number of years, he said.

"I think that stock market-wise; if IBM annouces a 3032 and/or 3031, there could be a stock market impact on Amdahl — it may only be brief.

"I'm not sure it would affect its operating statement, but Amdahl is a speculative stock in that it's small, growing rapidly and you always have to be concerned about potential announcements from IBM and their effect, not so much on operating results, but on stock price," Edelson stated.

He suggested that Amdahl's impact on IBM has been "overdone.

"Just as IBM is taking some of the excess demand in the minicomputer industry, maybe Amdahl is doing the same thing in the mainframe area," he said. He estimated that 75% of Amdahl sales are additive, not replacements.

Amdahl basically agreed, saying he did not feel Amdahl had hurt IBM in any way, but rather was filling orders IBM could not fill because of production capacity limitations.

In other words, his firm is not, in the short term, stealing orders from IBM. But they are probably orders which, in the long term, would have been filled by the giant.

Update to Focus On Semi Impact

PALO ALTO, Calif. — The far-reaching impact of rapid advances in semiconductor technology will be highlighted at "Technology Update for Executives," to be held Sept. 25-30 at the Naval Postgraduate School in Monterey, Calif.

The conference is cosponsored by the Naval Postgraduate School and the Western Electronics Manufacturers Association (Wema), the trade association for the electronics industries.

The week-long program features intensive courses conducted by experienced educators from the Naval Postgraduate School and specialists from industry.

Registration is open to nonmembers as well as Wema members. For information contact Wema at 2600 El Camino Real, Palo Alto, Calif. 94306.

Adapso Sets Analysts Meet

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) has scheduled its fourth annual financial analysts meeting for Sept. 27 at the Biltmore Hotel in New York.

At the meeting, International Data Corp. will present its recently completed marketing, financial and statistical survey of the computer services industry.

In addition, the meeting will feature a series of talks dealing with the current status and future of the industry as it relates to whether IBM will reenter the services market.

Speakers include Charles Lecht, author of "Waves of Change" and president of Advanced Computer Techniques Corp.; Robert E. Weissman, president of National CSS, Inc.; and Nancy Scull, director of corporate planning for International Data Corp.

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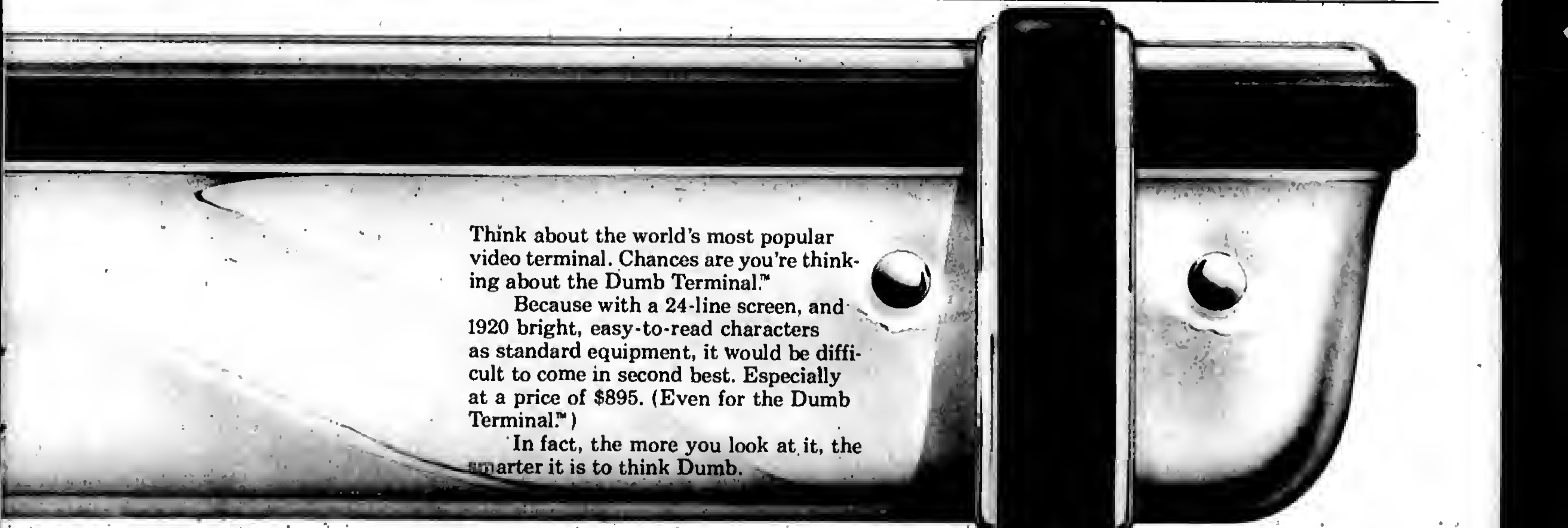

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International News

Turkish DP Arena Found Sluggish, Growing

ANKARA, Turkey — The first modern computer entered Turkey in 1961, but there is yet no established Turkish information processing policy, according to a study by the U.S. Department of Commerce.

The Turkish electronics industry currently is limited mainly to assembly operations though efforts are being made to establish a full range of manufacturing facilities. Presently, U.S. firms supply about 90% of the country's computer requirements, Commerce said, noting that business and industry generally are more receptive to computer utilization than is government.

Commerce expects computer imports, which are currently running at about $5 million a year, to grow slowly over the medium term to about $8 million a year, due to financial as well as technological limitations.

Since there is no established information processing policy, computer projects sometimes surface suddenly on an ad hoc basis. However, the State Planning Organization (SPO) is preparing legislation which will formulate a general information policy for the country, Commerce said.

At present, SPO also studies, coordinates and approves computer procurements for the public sector, while the Union of Chambers of Industry, Commerce and Commodity Exchanges of Turkey performs this function for the private sector, according to Commerce.

The government-established Turkish Electronics and Trade Corp. (Testas) has plans to manufacture a wide range of electronic equipment including process control systems and computers. To that end, it is contacting international electronic manufacturing firms for technical assistance and licensing agreements, Commerce said.

"Currently, apart from this, there are no known serious licensing, joint-venture or manufacturing efforts in the area of computer equipment, although completion of DP systems is becoming popular through other equipment manufacturers' agreements, which some Turkish companies successfully employ," the study said.

Insufficient or poorly defined application and utilization standards, legislative problems, structural administrative difficulties, shortage of DP personnel, fear of personnel displacement and low government salaries are among the factors inhibiting increased computer sales in Turkey, Commerce suggested.

There are about 150 accounting machines installed in Turkey today, 87% of which were supplied by U.S. firms and 13% by a Turkish company through OEM agreements with various U.S. companies. There are also some 20 laboratory and special process control computers, located mainly in universities and scientific research organization — not in industry.

The installed base of general purpose computers is only 136 (93% U.S. — supplied), with the largest systems installed by the Turkish Armed Forces and two universities.

Commerce estimates that by 1982, the installed base should grow to 428 accounting machines, 28 laboratory and process control systems and 444 general purpose computers.

In terms of potential for growth, the most promising immediate potential for additional systems applications are business and financial planning, management sciences, manufacturing applications and branch bank mechinization, Commerce said. Additional banking/insurance utilization and broader university applications who potential in the medium-term (2-5 years), it added.

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Deadline for all submissions is October 21, 1977. Authors will be notified as soon as possible and no later than March 1, 1978 regarding acceptance. Please send your submissions to:

Mr. Stephen W. Miller
CONFERENCE CHAIRMAN
Stanford Research Institute
333 Ravenswood Ave., L 1109
Menlo Park, CA 94025

or

Dr. Leonard Y. Liu
PROGRAM CHAIRMAN
IBM Research Laboratory
K51/282
5600 Cottle Road
San Jose, CA 95193

For a copy of the NCC paper guidelines, contact AFIPS, 210 Summit Avenue, Montvale, N.J. 07645; 201/391-9810.

Foreign Orders & Installations

The Finnish Ministry of Education has ordered three Univac 1100/11 systems. The first two systems will be delivered to the Universities of Oulu and Tampere this year, and the third to the University of Jyvaskyla early in 1978.

The Ministry of Communications of India has ordered 30-channel pulse-code modulation equipment from Fujitsu, Ltd. The PCM-30 system will be delivered to New Delhi, Bombay and Poona this autumn, and will be in operation by the beginning of 1978.

The Voluntary Health Insurance Board of Dublin, Ireland has ordered a Model 62/60 system from Honeywell. The equipment will handle claims processing and policy renewals.

The University of the Bundeswehr Hamburg, operated by the West German defense forces, has ordered a Univac 1100/21 system, to assist in its training program.

The European Center for Medium-Range Weather Forecasts has ordered a Cray-1 system from Cray, Research, Inc.

The Dublin Savings Bank has ordered an NCR Corp. Criterion 8550 system to help accommodate the growth of its transaction-processing network.

Both the Johnan Credit Bank and the Yasuda Trust and Banking Co. of Tokyo have ordered Univac 1100/42 systems.

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Cassette Bows

NEWTON UPPER FALLS, Mass.— A cassette recorder that receives data at rates up to 500 word/sec is available from Memodyne Corp. for $1,030 in single quantity.

The 3773 may be used with microprocessor-based data logging, communication and process control systems as well as with CRTs, minis and keyboard printers, the firm indicated.

The unit contains a reel-to-reel transport drive with two moving parts and cards for servo functions, read and write, control and buffer.

Read and write speed is 20 in./sec and search and rewind speed is 100 in./sec.

Memodyne Corp. is at 385 Elliot St., Newton Upper Falls, Mass. 02164.

OEM Products

Range of Print Heads Announced

Infomag Offers Dot-Matrix Unit

GOLETA, Calif. — Information Magnetics Corp. has entered the data printer market with a dot-matrix head. The unit, designed as a replacement for the Victor unit, is a compact printer with a duty cycle rating up to 200 char./sec, according to the firm.

The head, which comes in models 120, 160 and 200, can be adapted to most dot-matrix data printers, according to the firm.

It has a 9 by 7 dot matrix with a rated life of 200 by 10^6 characters minimum, the firm said.

The head can print an original plus five copies of forms up to 132 characters wide.

The head costs about $100 when purchased in quantities of 10,000 from Information Magnetics Corp., 5743 Thornwood Drive, Goleta, Calif. 93017.

Unit Prints 3 Line/Sec

ELMSFORD, N.Y. — The PR2100 series of impact printers from Sheldon-Sodeco Printer Co. print at speeds up to 3 line/sec for numeric and 1.5 line/sec for alphanumeric.

The 21-column printers have "spanning hammers" that form characters for each group of three columns, which reduces the number of moving parts, the firm said.

Units use standard paper tape and cost $130 in quantities of 100 from Sheldon-Sodeco Printer Corp., 4 Westchester Plaza, Elmsford, N.Y.

Victor Has 110 Char./Sec Entry

CHICAGO — Victor Comptometer Corp. has unveiled a print head which it said represents a 20% improvement in duty cycle over the firm's previous model.

The 129-112 print head features a 7-wire dot matrix and prints at 110 char./sec. Weight is 9 oz.

In lots of 1,000, the unit costs $59.50 from the firm at 3900 N. Rockwell St., Chicago, Ill. 60618.

3350 Disks Get Clock Writer

SANTA MONICA, Calif. — Pioneer Magnetics, Inc.'s Clock and Sector Track Writer is designed to write the fixed-head timing track on the 3350 "Winchester"-type disk memories, the firm said.

The clockwriter is one model of Pioneer's PM 2390 series, which allows the writing of a closed clock track at bit rates as high as 24M byte/sec, the firm said. The instrument can also write custom sector and address patterns as well as open clocks with any gap length up to 100 microsec, Pioneer said.

The unit can also be used to measure frequencies to 25 MHz, measure amplitude and/or frequency modulation. It detects area or pinhole defects and measures track following servo performance. Other features include origin or index writing, simultaneous track writing, variable bit symmetry control and selection of sector and address patterns via front panel switch, the firm said.

The PM2390 costs $9,950 each with delivery in 90 days from Pioneer Magnetics, Inc., 1745 Berkeley St., Santa Monica, Calif. 90404.

Part & Parcel

SUNNYVALE, Calif. — Shugart Associates lowered prices on its SA400 minifloppy disk drive as much as 15% effective July 1.

The price for 500 drives is reduced from $250 to $215, for example, the firm said. The firm said it is in high-volume production of the units, shipping 1,500 to 2,000 drives a month, and expects to reach 4,000/mo by year's end. Shugart is at 415 Oakmead Pkwy., Sunnyvale, Calif. 94086.

• • •

Intel Memory Systems In-2010 is a static semiconductor memory card with read and write cycle time of 115 nsec. Maximum capacity of the card is 8K by 32 bits, plus a parity bit. The card is 11.75 in. by 15 in. and costs $2,850 in lots of five to nine. Intel Memory Systems is at 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

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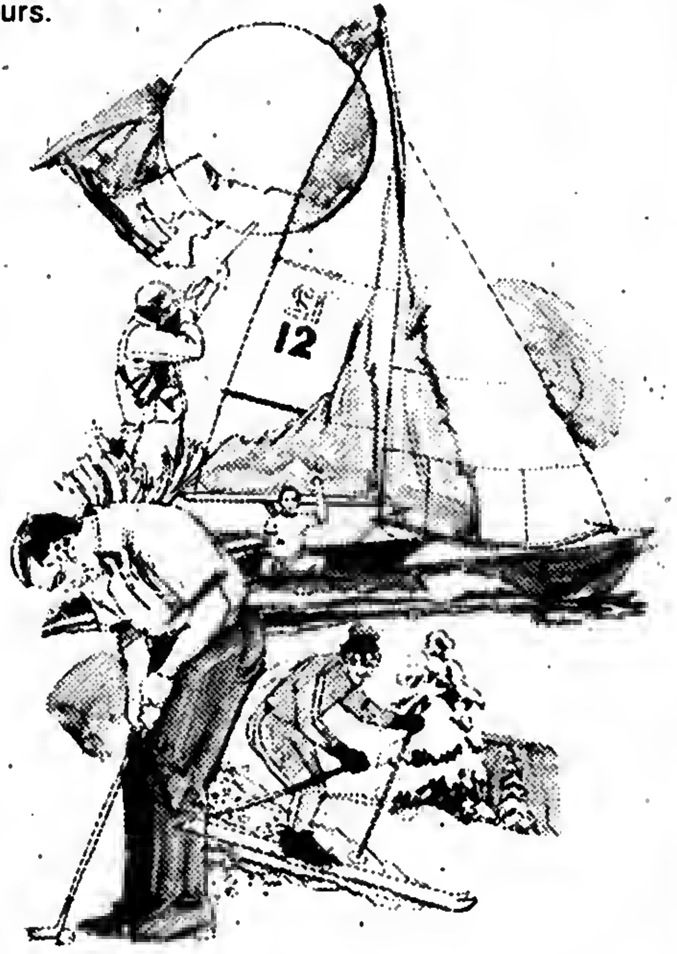

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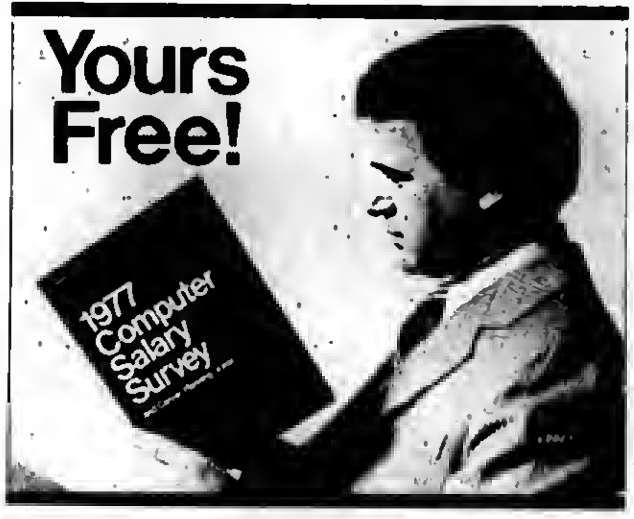

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  NYC location
- **EDP Manager** — **To $35K**
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- **Sr Analyst** — **To $26K**
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LESLIE. KAVANAGH
505 5th Av, NY, NY 10017
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Corporate Inquiries Welcome

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc. the prime operating contractor to the Energy Research and Development Administration at the Idaho National Engineering Laboratory has immediate openings for:

SYSTEM ANALYSTS
SENIOR PROGRAMMERS
PROJECT LEADERS

Candidates should have a college degree, or equivalent, and a minimum of 4 years experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and a knowledge of JCL for OS/MVT is desirable.

Idaho Falls, Idaho, is a medium sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreational areas (Yellowstone, the Salmon and Snake Rivers, and the Grand Tetons).

If interested and qualified, please submit resume, including salary history and requirements, in confidence to:

Technical Employment

EG&G

EG&G Idaho, Inc.
P.O. Box 1625, Idaho Falls, Idaho
An Equal Opportunity Employer
U.S. citizenship required
We welcome responses from minorities/
females and Handicapped M/F

PROGRAMMERS -- ANALYSTS

DASD Corporation, a national consulting firm specializing in Software Product development and Contract Services, is planning to increase its staff considerably during 1977. Positions are now open in the following areas:

- Project Management
- Project Leaders
- Senior Analysts
- Programmer/Analysts
- Programmers
- DATA BASE CONSULTANTS

We are looking for people with experience in any of the following categories:

COBOL
ALC/BAL
RPG II
PL1
FORTRAN

IMS
TOTAL
IDMS
CICS
CFMS
DBOMP

IBM (DOS, OS, VS)
BURROUGHS
HONEYWELL
CDC

This is an excellent opportunity for the right individuals.

Benefits include Blue Cross Blue Shield Medical Ins., Life Ins., Disability Ins., Retirement Plan and an excellent salary:

We have offices in Milwaukee, Chicago, Houston, Los Angeles and Philadelphia. Expansion plans for other cities are also underway. We will relocate you to accommodate your career as well as DASD's plans.

Please call or send your resume to our Corporate Offices at:

DASD CORPORATION

e705 North Port Washington Road, Suite 301
Milwaukee, Wisconsin 53217
(414) 351-2600

UTILITY EXPERIENCE - BACKGROUND

CIBER has immediate and future openings for:

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SYSTEMS ANALYSTS

We are looking for capable individuals to augment our Utilities application staff. The skills required include:

- **Large Mainframe experience on IBM, Burroughs, Honeywell**
- **Varied utility applications experience particularly Customer Billing application**
- **Five or more years directing or systems design experience in developing major utility applications**
- **Structured design and programming methodology**

CIBER offers our employees the opportunity to develop - to grow - to expand their knowledge in new and varied atmospheres.

In addition, we provide paid vactions, paid holidays, incentive compensation, scheduled reviews and meritorious salary increases. Our benefits plan (fully paid) is a model for the EDP service industry.

Call or forward your resume today to:

30400 Telegraph Road
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Bingham Farms, MI 48010
(313) 642-2900

1777 W. Camelback Road
Suite M-108
Phoenix, AZ 85015
(602) 248-0813

CIBER *We Are an Equal Opportunity Employer M/F*

PROGRAMMER ANALYSTS SYSTEMS ANALYSTS PROJECT LEADERS

Hanas Hosiery, Inc. has challenging positions opan for programmer/analysts, systams analysts and project leaders.

These positions offer involvement wtih a sophisticated large-scala Honeywell computer environmant featuring powerful on-lina program development softwara, distributed processing on minicomputers, data base management systems, and transaction processing software. Our company is committed to the utilization of state-of-theart hardware and software facilities.

We seek creativa Individuals with provan abilities in the development of application programs, planning and design of business systems, and systems project management.

Experience with utilization of Honeywell large system softwara will be a definite advantage but not a prarequisite for each of these positions.

In eddition to an attractive salary and liberal benefits package, you'll enjoy the advanteges of living in a mild, sunny, southeastern location. Please send resume with complete salary history in confidence to:

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Winston-Salam, N.C. 27102

An Affirmative Action Employer

SYSTEMS ANALYSIS

Work includes design of Fire Control and Command & Control Systems for attack submarinas. Realtime assembly language programming experience required. Exposure to AN/UYK-7, 20 CS-1, CMS-2 or ULTRA 32 desired.

Systems Consultants, Inc. is a netional systams engineering firm headquartered in Washington, D.C. These positions are loceted in Newport, R.I., a unique small community offering vast recreational and cultural opportunities.

In addition to Interesting assignments, we offer competitive starting salaries, fringe benefits and relocation expehses.

If you qualify, please send rasume to:

Newport Division
SYSTEMS CONSULTANTS INC.
10 John Clarke Road
Middletown, RI 02840

SCI
SYSTEMS CONSULTANTS INC

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mini-computer programmer opportunity

If you are Interested in:

Mini-Computer Manufacturing Applications
Interactive Transaction Processing
Data Base Management Systems

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We offer a competitive salary based on individuel talent, education end experience, end an ettractive fringe benefit package. For more Information, please send e deteiled letter or resume to: Ms. Lee Carroll

, or call (205) 438-3411

TELEDYNE
CONTINENTAL MOTORS
Aircraft Products Division
P.O. Box 90
Mobile, Alabama 36601
An Equal Opportunity Employer M/F

SOFTWARE DEVELOPMENT

Unprecedented success in General Instrument Corporation's growing point of sale and legalized wagering terminal systems business in Hunt Valley, Maryland, has generated expanding requirements for software development and applications programmers.

We have immediate and continuing requirements for assembly and higher level language programmers with at least 2 years experience for real time, on line microcomputer applications. Ability to create, program, debug, install and troubleshoot software on PDP 11, Nova, Varian or similar minicomputer is important.

Qualified candidates are requested to call Don Parsons on our toll free number, (800) 638-6395, or submit resume in confidence to:

GI
GENERAL INSTRUMENT CORPORATION
DATA SYSTEMS AND SERVICES GROUP
11126 McCORMICK ROAD HUNT VALLEY MARYLAND 21031
An Equal Opportunity Employer M/F

EXPERIENCED SYSTEMS PROGRAMMERS

We currently offer a limited number of ambitious programmers an opportunity to broaden their experienca with one of the most advanced and sophisticated computer facilities in the country. Available positions are in the following areas:

- Telecommunication Software
- Real-time Systems
- Performance Measurement and Evaluation
- Minicomputers

To qualify, you must be experienced in large system support including SVS/MVS, HASP/JES2 and VM370. And have a BS or MS in Mathematics or Computer Science.

These openings are with New Englands largest employer and in a major division of a corporation high on the Fortune 500 listing. Thus, you will find salary levels and benefits at very desirable levels.

For an immediate consideration, send your resume (including salary progress) to Professional Recruitment, Office 124, Pratt & Whitney Aircraft Group, East Hartford, Ct. 06108.

PRATT & WHITNEY
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UNITED TECHNOLOGIES

An Equal Opportunity Employer
Male and Female

SENIOR SYSTEMS ANALYST

Excellent professional opportunity at West Virginia University in analyzing and designing administrative systems. Bachelor's Degree in a related field or equivalent experience. Work experience in systems design and analysis of financial systems. Thorough knowledge of business computer programming. Competitive salary and benefits. Forward resume along with salary history to: Mr. E.J. Podeszwa, Personnel Officar, West Virginia Universitv. Morgantown, West Virginia 26506. Please apply by September 30, 1977. An Equal Opportunity/Affirmative Action Employer M/F.

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IMS-On-Line, Jr. and Intermediate level; Cobol-OS on banking and insurance system, manufacturing systems-to $700 per week. Some over-seas (permanent) and western regional openings.

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SIGMATICS, C9A, J.A. Cummings, 2082 Business Center Driva, Sta. 215, Irvina, Calif. 92715 (714) 833-1143, (408) 246-8940 or (602) 266-0466.

Regional Manager

Pittsburgh Office

Must have ability to manage a remote computing marketing profit center. A total professional, exp. in applying computer languages and services to client applications. Able to direct other professionals and interface with clients at the highest levels.

Experienced DEC-10 Operator

Braintree, Corp. Headquarters

Must have ambition, flexibility and capability to interface with clients.

Excellent salary and total benefit package plus bonus plan.

Please send rasuma to Mr. Robert Hanlon.

Interactive Sciences Corporation
60 Brooks Drive
Braintree, Ma. 02184

NETWORK ANALYST

Our Corporate Data Processing Center located in Fullerton, California, has an immediate opening for an experienced Network Analyst. Position responsibilities include participation in the design and implementation of a packet switching network initially consisting of three nodes and ultimately five, with emphasis in the front and end processor area. This network will be implemented to serve the needs of all Hughes Aircraft users and will provide access to the following systems:

- AMDAHL 470/6
- IBM S/370-165, 158, 148, 115
- DEC System/10
- Many Minicomputers

Required background should include:

- Experience with either COMTEN or CCI front end communication control units
- Bachelor's degree in a technical discipline
- Experience with IBM or AMDAHL host computer systems
- Demonstrated ability to communicate and prepare "completed staff work."

Qualified applicants should send their resumes to: Ground Systems Group, Employment Dept. O, P.O. Box 3310, Fullerton, CA 92634.

HUGHES
HUGHES AIRCRAFT COMPANY

U.S. citizenship required • Equal opportunity M/F/HC employer

MANUFACTURING SYSTEM ANALYSTS

NCR is now involved in the development of an Integrated, on-line Manufacturing Control System for use both in our manufacturing divisions and for sale to our customers. The system will address the following application areas:

BILL OF MATERIAL
STORES CONTROL
INVENTORY MANAGEMENT
STANDARD COST
ROUTING
WORK-IN-PROCESS
PLANNED ORDER RELEASE
MATERIAL REQUIREMENTS PLANNING

This development effort has created opportunities in the following area:

SYSTEMS ANALYST/PROGRAMMERS

Major emphasis will be to prepare the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include 3-5 years systems and programming experience using COBOL in one or more of the above application areas. Ideally that experience will also include the use of data base and on-line processing.

The ideal candidates will have a bachelor's degree in an appropriate discipline.

To arrange for local interviews, send your resume to:

NCR

Mr. Vernon L. Mirre
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

COMPUTER PROFESSIONALS

M.I.S. INTERNATIONAL, INC. – an internationally known computer systems integration organization – requires specialized professionals for top assignments in our Michigan and Indiana branches.

Knowledge of the following computers is desirable:

- Real Time Analysts/Programmers with experience in Micro/Mini-Computers: DEC, ModComp, T.I. 990
- Business Systems Analysts/Programmers with experience in COBOL/PL-1 on IBM, Burroughs, and Honeywell mainframe computers.
- Data Base Management Analysts/Programmers with experience in IMS, DMS-11, IDS.

Experienced men and women interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully-paid fringe benefits, educational opportunities and relocation allowances. You are invited to send your resume to Mrs. M. Rosellap

M.I.S. INTERNATIONAL, INC.
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

Scientific Computing Consultant

Our Corporate Computing Center has an opening for a scientific computing consultant. Major responsibilities will consist of providing programming and debugging assistance to scientific computer users, conducting seminars and short courses in FORTRAN, JCL and other programming subjects. Other duties will include writing user documentation and participating in software product evaluation and software quality assurance testing.

A Bachelor's degree in mathematics, computer science or in a related scientific field is mandatory. Experience in scientific programming with extensive knowledge of FORTRAN and OS or VS JCL, teaching experience, good communication skills, and an ability to work well with people are essential.

Qualified applicants should send their resume to: Ground Systems Group, Dept. B, P.O. Box 3310, Fullerton, CA 92634.

HUGHES
HUGHES AIRCRAFT COMPANY

U.S. CITIZENSHIP REQUIRED
Equal Opportunity M/F/MC Employer

INSTALLATION CONSULTANT

Analytical, affable person needed as consultant for broadcasting stations installing D.P. systems. General BA or BS degree required. Must have 4 years experience in broadcasting and 2 years in D.P. 25% travel, basic 40 hrs/wk, $1300/month. Exc. benefits and working conditions. Apply to nearest Colorado Job Service for referral. Columbine Systems, Inc.

ILLINOIS BOARD OF HIGHER EDUCATION

COMPUTER PROGRAMMER

Immediate opening — position requires experience with scientific software packages. Self-sufficiency in data processing systems design required. Must hold at least a Bachelor's degree. Salary up to mid-teens, depending on experience and qualifications.

For confidential attention and a more detailed job description, please send resume by October 1, 1977 to:

Paul E. Lingenfelter
Illinois Board of Higher Education
500 Reisch Building
4 West Old Capital Square
Springfield, Illinois 62701
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SYSTEMS ANALYST/ PROGRAMMER V.

Central Washington University has openings for two senior level positions with project lead responsibilities in major applications areas. Interactive PDP 11/45 and remote IBM S/370's support site. CWU is a pioneer in large scale networking and local interactive mini support for on-line student registration.

Salary range $1550-$1984 monthly, with good fringe benefits.

Applications will be accepted until September 30, 1977.

Contact Don Clerk
Director Computer Services
CWU, (509) 963-2921
EEO/AA/Title IX Institution

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We need people with one to three years experience in NOS, KRONOS, SCOPE, or NOSBE internals. Our clients offer excellent career paths, outstanding work environment and starting salaries of $18 to $24K.

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Continuing emphasis on profit maximization throughout corporate and divisional management has created an exceptional opportunity for a systems professional who can provide leadership in the planning and development of advanced business systems. For consideration, you'll need an MBA or an MS and a good understanding of financial and economic theory as it applies to overall profits. Four or more years background in project management experience that demonstrates accomplishments in planning, developing and implementing on line as well as batch systems with large scale and mini-computers in the areas of manufacturing, order entry, inventory control, purchasing, accounts payable and general ledger is also necessary. Send resume in strictest confidence to: M. Tomaszewski, Dept. 5722

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BORDEN INC.
180 E. Broad St.
Columbus, Ohio 43215

An Equal Opportunity Employer M/F

Data Processing

OPPORTUNITIES IN WESTERN MICHIGAN

DATA PROCESSING

Teledyne Continental Motors, General Products Division is dedicated to the concept of a totally new manufacturing control system and we presently need several professionals to help us to attain and maintain our goal.

We are a major producer of diesel engines and have a number of challenging opportunities for qualified individuals to join our data processing group. The following positions are available:

SYSTEM ANALYSTS

Must have several years of solid manufacturing data base systems experience and appropriate degree is highly desirable.

PROGRAMMERS

Must have 3-5 years programming background with COBOL and data base experience in a manufacturing environment.

We offer challenging projects and career opportunities located in the heart of Lake Michigan vacationland. Excellent salary and benefit program are available. For confidential consideration submit your resume with salary requirements or call collect.

Jim Riegler (616) 724-2846

TELEDYNE
CONTINENTAL MOTORS
GENERAL PRODUCTS DIVISION
76 Getty St., Muskegon, Michigan 49442
An Equal Opportunity Employer M/F

programmer/ analyst

Creative System Applications

If you seek a more varied and creative data processing environment in which to apply your OS/COBOL experience, you'll find stimulating career challenges are yours at our suburban Chicago subsidiary of a major "Fortune 500" company.

Position requires an individual with a minimum of two years OS/COBOL Programmer/Analyst experience, capable of communicating effectively with clients to resolve their varied data processing objectives. Excellent written and verbal skills a must.

For confidential consideration, forward resume detailing salary history, in confidence to:

CW Box 3152
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer M/F

Corporate Systems Development

Due to increased growth within the company, demanding positions are open in the following areas:

Business Systems Applications— Project Manager

To provide leadership, planning and coordination between interorganizational groups in the design of business application systems which support corporate MIS needs. Ability to identify logical system alternatives, forecast impact and communicate effectively with multi-corporate levels. Six to eight years D.P. experience with emphasis in systems analysis and project management. Degree in computer science/business is desired.

System Planning Analyst

Participate in all phases of a long range strategic systems development plan for business applications. Multi-corporate level interaction requires comprehensive understanding of business activities. Communication skills must be highly competent. Requires extensive experience in strategic planning, systems development and installation; MBA with computer science or equivalent experience.

Systems Analyst

Develop business application systems utilizing advanced computer technology to achieve management information capabilities and requirements. Interaction with interorganizational groups requires effective communication skills. Requires extensive experience in systems design, development and installation; BS in computer science with business minor or equivalent experience.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by nature playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Please send complete resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, C59, Beaverton OR 97077.

An Equal Opportunity Employer M/F/HC.

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$32,000 to $36,000

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No Fees To Applicants

B 6700 SYSTEM SOFTWARE SPECIALIST

Dynamic Central Florida installation requires an individual with minimum 4 years Burroughs large system experience including "Algol" and at least 2 years Datacom and/or DMS II experience. Send resume in confidence to - Florida S&L Services, Inc., P.O. Box 1547, Orlando, FL 32802. *Equal Opportunity Employer*

PROGRAMMER ANALYST

Immediate opening for Programmer/Analysts, with a minimum 5 years experience with IBM hardware. Knowledge of S360/S370 OS, DOS/JCL, PL/1, Assembler, CICS, manufacturing applications. Excellent career opportunities. Salary commensurate with experience. Excellent benefits. Send confidential resume to:

Personnel Director
General Motors Assembly Division
General Motors Corporation
Western Avenue
Framingham, Mass. 01701
Equal Opportunity Employer

PROGRAMMER-ANALYST

Outstanding opportunity for qualified programmer-analyst. Requires a minimum of 2-3 years experience in manufacturing, a working knowledge of Fortran and some systems analysis and design experience.

Excellent company benefits, opportunity for advancement; salary commensurate with abilities. Must design and implement manufacturing systems — interface IBM 370, HP 3000 and HP21MX systems.

For confidential interview, contact Joe Halow, Fereh Manufacturing Co., Inc., P.O. Box 9519, El Paso, Texas 79985 (915) 593-4457.

Equal Opportunity Employer M/F

SENIOR PLANNING ANALYST

STATE OF OREGON

Work with an assigned group of agencies in planning, budgeting and procurement related to data processing and a variety of special assignments. Responsible for complex assignments and budget analysis.

Candidates must clearly demonstrate knowledge and ability in data processing, analytical techniques, fiscal and budget analysis and competitive purchasing.

Bachelor's Degree and five years applicable experience minimum. Graduate work may count as experience up to two years. Salary level: $18 - 23K

Lower level position requiring only three years experience also open. Salary $16.5 - 21K

To expedite application process phone Phillip W. Morgan (503) 378-4126.

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Perhaps you've been casting a covetous eye at some other areas of the country . . . a place where you could more successfully fulfill your ultimate destiny . . . and realize your life style.

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NATIONAL COMPUTER ASSOCIATES

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Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2560
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W 7th Ave
Miami, Florida 33169

HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
601 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

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Batel Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc.
1046 E Wendover Ave
P.O Box 6666
Greensboro, N. Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa 19086

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
The Computer Resources Group Agency, Inc
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc. (Agency)
2530 James Street
Syracuse, New York 13206

TULSA
Data Processing Careers, Inc
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklahoma 74114

WASHINGTON, D.C.
ESP Systems Corporation
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1211 Connecticut Avenue N W
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DALLAS

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OPPORTUNITIES... to work on a team of professionals to generate new data processing concepts and carry them through to implementation.

OPPORTUNITIES... to enjoy an attractive salary and fringe benefits offered by E-Systems.

OPPORTUNITIES... to participate in developing and producing state-of-the-art electronic systems for data management, digital communications and highly complex data processing systems.

OPPORTUNITIES... to participate in a formalized in-plant upgrading/on-the-job software training program.

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Make a good living where the living is good. There's no question – living is good in the Dallas area. Our public school systems have earned national recognition for excellence. We're one of the fastest growing areas in the nation, yet our housing dollar still buys considerably more home in Dallas than it would in most other metropolitan areas. We're surrounded by lakes, and blessed by beautiful weather year 'round. We back professional, university, and high school athletic teams, and we support our symphony, theaters, the civic opera and several museums. But, best of all, most of us are down home friendly people.

E-SYSTEMS
Garland Division
An equal opportunity M/F employer

If you qualify, send your resume with salary history to:
Employment Manager
E-Systems, Inc.
P.O. Box 6118
Dallas, TX 75222

PROGRAMMERS

SYSTEMS PROGRAMMERS

Fluor Corporation, a dynamic and internationally respected leader in the engineering and construction field, has immediate openings for CDC Cyber 170 systems programmers with SCOPE OR NOS/BE experience.

OPERATING SYSTEM SUPPORT

- A minimum of 2 years' experience maintaining a CDC SCOPE 3.4 or NOS/BE operating system.
- Proficiency with CP and PP COMPASS
- Experience in analyzing dumps from system failures and generating/locating corrective codes.
- Familiarity with basic internals of SCOPE or INTERCOM

The individuals selected must be able to maintain a stable version of NOS/BE at current PSR levels. Additional duties will include installation of local modifications, evaluation of system performance and user consultation.

PRODUCT SET SUPPORT

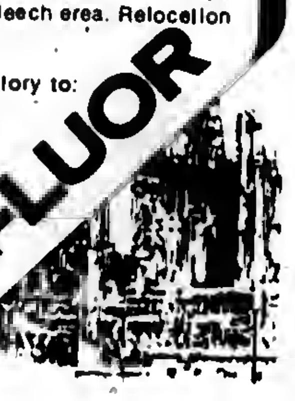
- A minimum of 2 years' experience with internals of compilers and compiler object time routines
- Proficiency with CP COMPASS and/or SYMPL
- A working knowledge of FORTRAN and COBOL

The individuals selected will be responsible for maintenance of product sets, installation and testing new versions supporting applications programmers, writing utilities and specialized subroutines in the area of application support.

Our employees enjoy excellent benefits including profit sharing and savings investment program. Positions are located in our new innovatively designed facility in the Newport Beach area. Relocation allowance available.

Please send resume, complete with salary history to:

Nellie M. Bedford COM905
FLUOR CORPORATION
P. O. Box 11977
Santa Ana, CA
92711



Equal Opportunity Employer M/F

MODCOMP

We are seeking experienced professionals to join us and be a part of our rapid expansion in the booming mini-computer industry. There's never been a better time to consider the outstanding career opportunities with MODCOMP and the good life in sunny Ft. Lauderdale, Florida.

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Total design and implementation responsibility in the development of diagnostic programs for central processing units, memories and peripheral control units with emphasis on communications and process control. Interact with development engineers throughout the product development phase. Experience in assembly level diagnostics required; microprogramming, microprocessor, and digital logic background desirable.

DIAGNOSTIC SOFTWARE MAINTENANCE

Maintain current hardware diagnostic programs, investigate diagnostic software problems, design and implement corrections/enhancements to diagnostic programs, critique and assure performance of new diagnostic software. This position allows exposure to complete product line and possible growth into development of new diagnostic programs. Assembly language background required; experience in digital logic and electro-mechanical devices desirable.

SOFTWARE DEVELOPMENT PROGRAMMERS

Mid and senior levels to participate in the development of standard software products for the MODCOMP II and IV product lines in the areas of operating systems, networks, communications software, QA and maintenance.

We offer competitive salaries, substantial fringe benefits and an outstanding opportunity for career growth and advancement. For further information call or send resume including salary history to:

Mr. Robert M. Coyner
(800) 327-8997 (toll free)

MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road, Ft. Lauderdale, Fla. 33309

An Equal Opportunity Employer M/F

MODCOMP

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Nationally known NYC stock brokerage firm is establishing an EDP audit group MBA with 5+ yrs of EDP audit experience & ability to take on an expanding work load leading to supervisors position is required. Ground floor oppty. $25,000 FEE PAID

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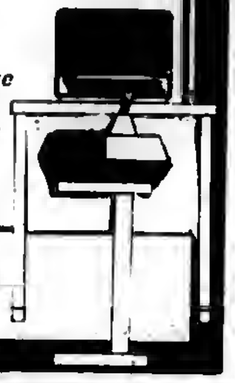

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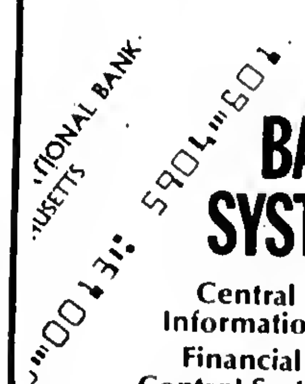

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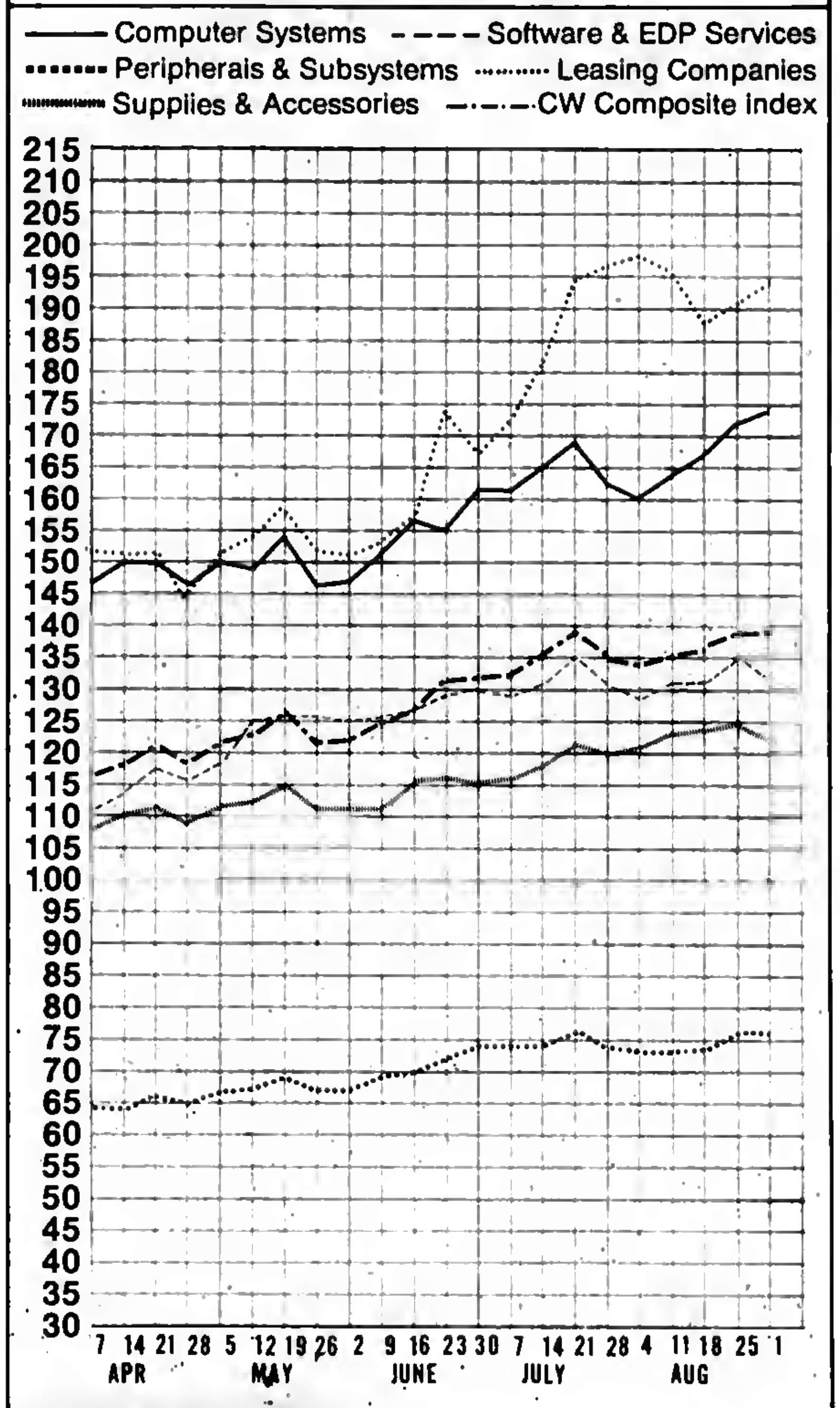

Earnings Reports

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Three Months Ended June 30

	1977	1976
Shr Ernd	$.13	$.10
Revenue	6,048,000	4,741,000
Earnings	301,000	234,000

CAMBRIDGE MEMORIES
Three Months Ended May 28

	1977	1976
Shr Ernd	$.59	($1.11)
Revenue	1,840,000	5,799,000
Tax Cred	115,000	.....
Earnings	994,000	(1,880,000)
9 Mo Shr	2.37	(1.46)
Revenue	5,403,000	17,356,000
Tax Cred	342,000	.....
Earnings	4,022,000	(2,484,000)

CENTRONICS
Year Ended June 30

	1977	1976
Shr Ernd	$2.08	$1.82
Revenue	58,100,000	52,176,633
Earnings	12,850,000	9,763,615

COMPUTER TRANSCEIVER SYSTEMS
Three Months Ended May 31

	1977	1976
Shr Ernd	$.11	$.06
Revenue	1,255,476	935,084
Earnings	103,732	50,794

COMPUTERVISION
Three Months Ended June 30

	1977	1976
Shr Ernd	$.27	$.12
Revenue	11,308,000	7,892,000
Earnings	643,000	282,000
6 Mo Shr	.48	.18
Revenue	21,805,000	14,490,000
Earnings	1,137,000	387,000

COMSHARE
Year Ended June 30

	1977	1976
Shr Ernd	$1.30	$.85
Revenue	18,212,700	13,757,800
Earnings	2,016,800	1,172,500
3 Mo Shr	.31	.13
Revenue	5,237,300	3,542,100
Earnings	528,800	194,900

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 31, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	40 1/4	-3 1/4	-7.4
N	BURROUGHS CORP	55- 91	71 1/4	+ 5/8	+0.8
O	COMPUTER AUTOMATION	18- 30	28 5/8	+ 3/4	+2.6
N	CONTROL DATA CORP	20- 26	21 1/4	+ 1/2	+2.4
O	CRAY RESEARCH INC	15- 28	27 3/4	+1 1/4	+4.7
N	DATA GENERAL CORP	35- 51	48 5/8	- 3/8	-0.7
N	DATAPOINT CORP	18- 32	31 1/2	+2 7/8	+10.0
N	DIGITAL EQUIPMENT	37- 53	48 1/8	0	0.0
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	10	+ 1/2	+5.2
O	FOUR-PHASE SYSTEMS	13- 18	16 3/4	- 5/8	-3.5
N	FOXBORO	42- 54	47 1/4	-1 1/4	-2.5
O	GENERAL AUTOMATION	6- 9	8 1/8	+ 7/8	+12.0
O	GPI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	79 1/4	+ 1/2	+0.6
N	HONEYWELL INC	44- 55	48	-1 3/4	-3.5
N	IBM	245-286	268 3/8	+ 3/8	+0.1
O	MANAGEMENT ASSIST	5- 9	6 5/8	+ 1/8	+1.9
O	MEMOREX	23- 33	32 3/8	-1	-2.9
O	MICRODATA CORP	7- 18	14	+2 1/8	+17.8
O	MODULAR COMPUTER SYS	5- 8	7 1/2	- 1/2	-6.2
N	NCR	32- 47	45 1/8	+ 1/4	+0.5
O	PRIME COMPUTER INC	12- 20	20 1/4	+ 3/4	+3.8
N	PERKIN-ELMER	17- 22	20 3/8	+ 1/4	+1.2
N	RAYTHEON CO	16- 33	28 3/4	+ 1/2	+1.7
N	SPERRY RAND	34- 42	35 1/2	-1 1/8	-3.0
O	SYCOR INC	8- 15	10 7/8	+ 5/8	+6.0
A	SYSTEMS ENG. LABS	5- 8	7	- 1/4	-3.4
A	WANG LABS.	10- 21	12 1/2	-1 3/4	-12.2

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4	- 1/8	-3.0
O	BOOTHE COURIER CORP	8- 10	11 1/4	+ 1/4	+2.2
O	COMDISCO INC	10- 13	11	0	0.0
A	COMMERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.6
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	CCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	6- 9	9 1/4	+1 3/8	+17.4
N	ITEL	13- 22	21 3/8	+ 1/2	+2.3
N	LEASCO CORP	19- 27	24	-1 3/8	-5.4
O	LEASPAC CORP	1- 2	1	0	0.0
O	NPG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	- 1/8	-2.1
N	U.S. LEASING	10- 15	14	- 1/8	-0.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 7/8	0	0.0
A	APPLIED DATA RES.	5- 10	8	- 3/4	-8.5
N	AUTOMATIC DATA PROC	22- 30	27	-1 1/4	-4.4
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	- 5/8	-6.4
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK.	6- 10	8 7/8	- 1/8	-1.3
N	COMPUTER SCIENCES	7- 9	8 3/4	0	0.0
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMSHARE	5- 7	6	0	0.0
O	DATA DIMENSIONS INC	3- 5	3 3/8	0	0.0
O	DATATAB	1- 2	1 1/2	- 1/4	-14.2
N	ELECTRONIC DATA SYS.	16- 20	17 1/2	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/4	0	0.0
O	KEYDATA CORP	2- 3	1 7/8	+ 1/4	+15.3
A	LOGICON	7- 17	12 1/8	-1 1/8	-8.4
A	MANAGEMENT DATA	1- 2	1 7/8	+ 1/4	+15.3
A	NATIONAL CSS INC	19- 26	25	- 1/4	-0.9
O	NATIONAL DATA CORP	4- 7	5 3/8	- 1/8	-2.2
A	ON LINE SYSTEMS INC	17- 22	17 3/8	- 7/8	-4.7
N	PLANNING RESEARCH	3- 6	5 1/2	+ 1/2	+10.0
O	PROGRAMMING & SYS	1- 1	3/8	- 1/8	-25.0
O	RAPIDATA INC	2- 3	2 5/8	- 1/8	-4.5
O	REYNOLDS & REYNOLD	17- 20	18 1/4	0	0.0
O	SCIENTIFIC COMPUTERS	1- 3	4	+ 3/8	+10.3
O	TYMSHARE INC	14- 23	21 5/8	- 1/4	-1.1
A	URS SYSTEMS	4- 5	4 1/8	- 1/8	-2.9
N	WYLY CORP	1- 2	7/8	- 3/8	-30.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 7/8	0	0.0
O	ADVANCED MEMORY SYS	7- 9	7 1/2	0	0.0
N	AMPEX CORP	8- 11	10 1/2	+ 3/8	+3.7
O	ANDERSON JACOBSON	3- 5	3 7/8	- 1/8	-3.1
N	APPLIED DIG DATA SYS	10- 20	18 1/2	- 5/8	-3.2
O	BEEHIVE INT'L	8- 12	9 5/8	- 1/4	-2.5
A	BOLT,BERANEK & NEW	7- 8	7 1/4	- 1/8	-1.6
N	BUNKER-RAMO	8- 12	11	- 1/4	-2.2
A	CALCOMP	3- 5	2 7/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 3	2 7/8	+ 1/2	+21.0
N	CENTRONICS DATA COMP	22- 30	30	+1 1/8	+3.8
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 6	6 7/8	+ 3/8	+5.7
O	COMPUTER CONSOLES	4- 7	4	- 1/4	-5.8
A	COMPUTER EQUIPMENT	2- 3	3	- 1/8	-4.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	- 1/8	-10.0
O	COMTEN	9- 13	10 1/8	0	0.0
N	CONRAC CORP	19- 28	21 1/8	- 7/8	-3.9
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 1/4	- 1/4	-3.3
A	DATA PRODUCTS CORP	9- 16	14 7/8	+ 1/4	+1.7
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/8	+ 1/8	+8.3
O	DECISION DATA COMPUT	2- 3	2 1/4	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 3/4	+ 3/8	+5.0
O	DATAKAM CORP.	2- 8	7 3/4	+ 1/4	+3.3
N	ELECTRONIC M & M	4- 5	4	- 1/8	-3.0
O	FABRI-TEK	1- 2	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	8 7/8	+ 1/8	+1.4
N	HARRIS CORP	28- 39	36 5/8	+ 7/8	+2.4
A	INCOTERM CORP	10- 15	12	+ 5/8	+5.4
O	INFOREX INC	4- 7	4 3/8	- 1/8	-2.7
O	INFORMATION INTL INC	9- 14	12 1/4	+2	+19.5
O	INTEL CORP	38- 57	46 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	4 1/8	- 1/4	-5.7
O	MSI DATA CORP	6- 12	10 3/8	- 3/8	-3.4
N	MOHAWK DATA SCI	5- 8	6 1/2	0	0.0
O	PENRIL CORP	2- 5	3 3/4	0	0.0
A	PERTEC CORP	7- 9	8 1/4	+ 1/4	+3.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 7/8	+ 1/8	+3.3
O	RECOGNITION EQUIP	6- 10	8 3/8	+ 7/8	+11.6
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 16	15 1/4	- 1/4	-1.6
O	T BAR INC	7- 12	11 5/8	- 1/8	-1.0
O	TALLY CORP.	4- 6	4 7/8	0	0.0
A	TEC INC	7- 10	7 7/8	- 1/8	-1.5
N	TEKTRONIX INC	29- 38	37	0	0.0
N	TELEX	2- 3	2 3/4	+ 1/8	+4.7
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PROCS	6- 8	6 1/8	- 3/8	-5.7
O	BALTIMORE BUS FORMS	2- 4	2	+ 1/8	+6.6
A	BARRY WRIGHT	10- 14	13 5/8	- 5/8	-4.3
O	CYBERMATICS INC	1- 1	1	- 1/4	-20.0
O	DUPLEX PRODUCTS INC	14- 19	17	- 1/2	-2.8
N	ENNIS BUS. FORMS	6- 7	5 7/8	- 1/8	-2.0
O	GRAHAM MAGNETICS	11- 17	16 1/2	+ 1/4	+1.5
O	GRAPHIC CONTROLS	15- 18	15 1/2	- 1/2	-3.1
N	3M COMPANY	48- 56	52 1/8	+ 5/8	+1.2
O	MOORE CORP LTD	26- 37	27 1/4	- 1/4	-0.9
N	NASHUA CORP	16- 27	25 1/8	- 3/8	-1.4
O	STANDARD REGISTER	18- 25	21	- 1/2	-2.3
O	TAB PRODUCTS CO	13- 19	16 1/2	- 3/4	-4.3
N	UARCO	19- 22	19 1/4	- 1/8	-0.6
A	WABASH MAGNETICS	10- 15	12	- 1/8	-1.0
N	WALLACE BUS FORMS	17- 21	18 3/8	0	0.0

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Conventional Stop Lights Found Gas Gluttons

By Jeffry Beeler
CW Staff

MINNEAPOLIS — American drivers could save more than a million gallons of gasoline daily if conventional stop lights were replaced with computerized traffic control systems, according to a report issued by Honeywell, Inc.'s Traffic Management Center (TMC) here.

The report, prepared for the Federal Highway Administration (FHA) and the Federal Energy Administration, details the findings of a 1976 study of driving conditions in three U.S. cities and their effect on fuel economy.

In that study, Honeywell used FHA-supplied data to develop computer models of street sections in the three cities. Those sections included the Urban Traffic Control System (UTCS) network in Washington, D.C.; the intersection of Shattuck and Alcatraz in Berkeley, Calif., and parts of the Hawthorne arterial highway in Los Angeles.

With the computer models, Honeywell then simulated each city's driving conditions and noted the effect of variables like traffic control procedures, traffic volumes and street characteristics on gasoline mileage.

More specifically, the fuel consumption study entailed models of six typical traffic control situations. Some of the situations simulated and evaluated by Honeywell included a street-crossing system known as a "pedestrian scramble," arteries with exclusive bus lanes, one- and two-way streets and roadways with pretimed and "fully actuated" signal systems.

In pretimed systems, the length of the signal cycles remains constant regardless of traffic levels; in fully actuated systems, cycle lengths vary with auto volume.

Other simulated situations focused on variations in traffic demand and on traffic signals with varying cycle lengths.

Among their findings, experimenters concluded that a fully actuated traffic control system on Los Angeles' M St. would yield

(Continued on Page 6)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Dope/DP Caper Linked to Agent

NEW HAVEN, Conn. — A special agent for the U.S. Drug Enforcement Administration (DEA) allegedly embezzled computer printouts from the Narcotics and Dangerous Drugs Information System (Naddis) for use in a scheme to identify DEA informants and facilitate importation of marijuana, according to a grand jury indictment issued here.

The indictment against special agent Paul A. Lambert and alleged coconspirator George E. Girard Jr. included charges of embezzlement, receipt and sale of DEA records, plans to import marijuana from Mexico, possession of cocaine and defrauding the U.S. through interfering with the DEA's conduct of business.

Girard allegedly planned to use information from the DEA and other government sources to avoid border patrols while flying in marijuana from

(Continued on Page 4)

Hit Ratio 'Not Impressive'

Study Questions Worth of NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The National Crime Information Center (NCIC) has not proved its worth as a crime-fighting tool despite 10 years of operation, a preliminary report by the Scientists Institute for Public Information (Sipi) concluded here recently.

Prepared in response to a congressional committee's inquiry into NCIC operations, the report said that for such "a vast system, containing over six and one-half million records with 250,000 transactions per day, the 'hit' ratio was not demonstrated to be impressive.

"The actual benefits of NCIC still remain in the area of surmise, rather than demonstrated results," the report said.

Sipi's Task Force on Science and Technology in the Criminal Justice System, which made an on-site inspection of the NCIC at the J. Edgar Hoover Federal Bureau of Investigation headquarters in the nation's capital, said the system has about 1,000 hits per day. Fifty percent are for stolen vehicles, 20% to 25% are for wanted persons and the rest are scattered over six other categories.

"The maintenance of the huge NCIC system, growing every year, may be subject to question when there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement, and [when] comparable information may be available by other means, at cheaper cost and with less significant problems involving intergovernmental relations," the report maintained.

Officials at the FBI, which manages and maintains the system, defended their operations and criticized the report

(Continued on Page 6)

New I/O Proposal Reflects Diluted Standard Support

By Molly Upton
CW Staff

WASHINGTON, D.C. — The National Bureau of Standards (NBS) is apparently watering down its support for a channel-level I/O interface standard for federal government users.

In a proposal recently submitted for public review and comment, NBS revised the requirements that would make federal agencies adhere to the standard in selecting computer systems.

The changes reflect a "compromise" with mainframe manufacturers who oppose the standard, an NBS spokesman said.

The revisions do not alter the technical specifications, which were designed to allow the attachment of IBM-compatible peripherals to any CPU, but rather allow government agencies more latitude in their purchases.

The original standard — which is based on the IBM channel interface — was drafted by the American National Standards Institute (Ansi) X3T9 committee and by the NBS as a proposed Federal Information Processing Standard (Fips).

While that original Fips proposal required all channels of new and replacement systems to conform to the specifications, the new revision requires only that the system "support one to four interfaces and allows agencies to procure equipment with no such interfaces.

"All such interfaces shall be specified

(Continued on Page 4)

Edelstein Names Examiner To Search IBM Tape Files

By Catherine Arnst
CW Staff

NEW YORK — Judge David N. Edelstein, apparently agreeing with government charges that IBM has withheld certain damaging information from government trial attorneys, has appointed an examiner to search the firm's corporate files.

The information the Justice Department wants is IBM's Lease Base Machine Inventory (LBMI) and Purchase Base Machine Inventory (PBMI), both part of IBM's management information system. These tapes are alleged to contain an accounting of all IBM equipment delivered and installed since 1960.

The government contends IBM could provide the court with an accurate measure of the systems market IBM allegedly monopolizes.

IBM contends such information does not exist, and if it does, it is only on an ad hoc and unreliable basis.

Edelstein ordered that Herbert H. Isaacs, a director with Arthur Young & Co., be appointed to report to the court what tapes, other files, programs, documentation and other information [IBM] possesses and whether [IBM] has produced such material which will enable the plaintiff to determine cer-

(Continued on Page 5)

IBM 3033 Overbooked?

If you are number 801 on IBM's 3033 delivery list, maybe you should consider pricing some other system.

IBM is planning to manufacture only 800 Model 3033s, despite having orders for more than 2,000 systems, according to Australia's *Computer Weekly* newspaper.

IBM would not confirm or deny the rumor, saying only that such information is proprietary and of a nature that IBM does not discuss.

NEWSPAPER

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In Boston, Atlantic City

Micro Exhibitors Vie for Business

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — Two hobby computer shows were held on the East Coast in the space of four days recently — Computermania in Boston and PC '77 here.

Though both were devoted to microcomputing, they took on quite different personalities.

Technical sessions at the hobby gatherings ranged from concurrent seminars held during exhibit hours at both shows to additional preshow workshops here.

Most subjects relating to microcomputers were covered, including interfacing, programming, debugging, music and applications.

Slow Start

The Boston show seemed destined to a slow start when, just before the doors opened for the first day, almost 40% of the exhibitors had failed to show up or set up displays. This, combined with the spaciousness of the exhibit hall, gave the impression of a show that might not get off the ground. Even the building failed to cooperate as, shortly before opening, a huge lighting fixture fell from the ceiling and crashed into an aisle.

The first place for which most people headed was the well-publicized Radio Shack display. Crowds packed eight to 10 deep became a constant sight at that exhibit, evidencing the success of the promotion, which had focused on the Radio Shack TRS-80 microcomputer system.

Retail computer stores also drew large crowds as they offered visitors an opportunity to examine mixed-vendor systems and comparative systems. Components sales firms also attracted large crowds. The do-it-yourselfers came with checkbooks and shopping lists in hand, and many returned on Saturday to take advantage of last-day markdowns by vendors that were reluctant to take unsold merchandise "back home."

Coverage of Computermania and PC '77 continues on Page 75.

Yet many of the show's visitors left disappointed. Many were businessmen who were given the "surface illusion that they could solve all their business problems for $595 with a simple little computer. But they can't," according to Sonny Monosson, president of Boston's American Used Computer Corp. Monosson described the attendee's options as a "delightful computer hobby or a devastating business mistake."

Estimates of attendance at the three-day event ranged from a high of 14,111 paid attendees reported by show sponsors to lows of 5,000 to 7,000 reported by several exhibitors and other observers.

Atlantic City Exciting

PC '77 here had an entirely different flavor, though. A genuine excitement could be felt as exhibitors set up. That excitement was continued as the crowd began arriving several hours early to overflow the Shelburne Hotel's lobby and spill out onto the famous boardwalk. The long line for hall entry lasted much of the morning, yet visitors remained cheerful during waits of more than an hour.

The stars of the show had to be Radio Shack and Heath Co. This was the first public showing of the Heath systems and many visitors said they would have come just to see the firm's offerings. As it was in Boston, one could hardly get by the Radio Shack exhibit at times, despite the wide aisles. It was virtually impossible to get past Heath much of the time.

No attendance figures on PC '77 were available from show organizer John Dilks, who works as a computer-switching equipment installer for the telephone company. But exhibitor estimates ranged from 8,000 to 12,000 for the two days. Attendance at the related technical sessions was generally high and meetings of computer store owners as well as a manufacturers' association gathering drew relatively large groups.

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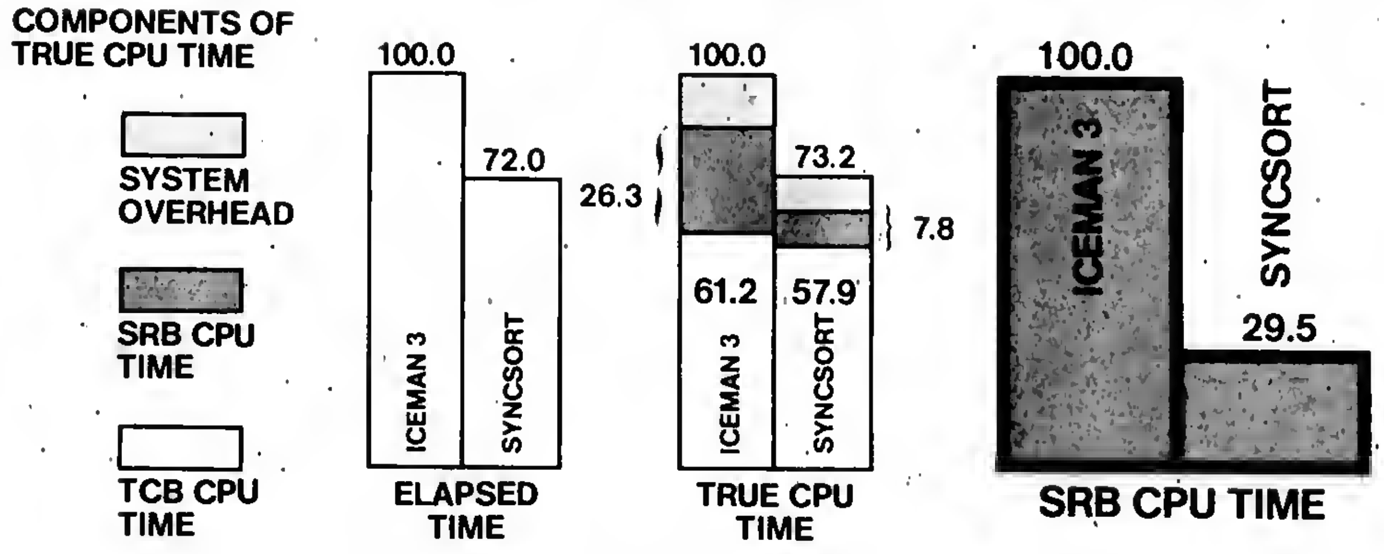
Take a look at the charts below. They compare SyncSort's overall MVS performance with IBM's 5740-SM1, Release 3. And the two on the right pinpoint the SRB Time differences.



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Latest I/O Interface Proposal Draws Criticism

By Molly Upton
CW Staff

The proposed changes to the federal government's implementation of the channel-level I/O interface standard "make a mockery out of the federal ADP standards program," according to Norman Ream, who was the first director of the National Bureau of Standards' (NBS) Institute for Computer Sciences & Technology.

"I'm bitter. I think [NBS] bent over backwards to satisfy the system manufacturers and it's a totally unenforceable standard," he said.

There's no requirement for an installation of the interface in the first place. If an adapter is to be used, there's nothing that requires manufacturers to demonstrate and verify its capabilities, he said.

The adapter's capabilities and cost benefits should be considered as part of the total evaluation of the system, Ream continued.

Harry S. White, associate director of ADP standards at the Institute for Computer Sciences & Technology, indicated that the revision is "a little softer" and represents "what's to be considered a reasonable compromise."

The mainframers are admitting the revision is more palatable; however, they still don't admit the need for a standard, he said.

White admitted federal procurement officers will probably encounter some complexities with the new proposal, especially in the area of cost benefit appraisal.

The changes were developed by the NBS technical division and NBS decided to go with the revision and see "to what extent it flies," White indicated.

Ream does not think the latest proposal will go through. "I don't think [Jack] Brooks' staff or Congress will stand still for this," he said, adding he expects the House Committee on Government Operations, headed by Brooks (D-Texas), to protest strongly.

NBS had not yet received any formal comments on the proposal, White said, but a spokesman for Brooks' office indicated there are plans to submit a comment.

'Very Political Process'

A.G.W. (Jack) Biddle, president of the Computer and Communications Industry Association (CCIA), commented that standardization has become a "very political process" with the mainframers threatening not to do business with the federal government under the original proposed standard.

Ream, in a draft of a letter to Commerce Secretary Juanita Kreps, described the shortcomings of the proposal and the effects it will have on the federal government's standardization efforts.

Although Ream recognizes Kreps is subject to much pressure, he said "if you give an inch you will find yourself and the department and the Fips [Federal Information Processing Standard] program on a slippery slope at the mercy of the forces that have their own blind and perverse logic."

"The failure to adopt a standard for the last 10 years has acted and continues to act as a severe restraint to competition in the federal procurement process," Ream stated.

It also has resulted in selected manufacturers obtaining indirect subsidies of at least $250 million, Ream said.

He estimated the government paid the $250 million over and above what it would have if a standard had existed requiring the ability to interconnect foreign peripherals.

"The increasing and almost overwhelming reliance of the federal government and its activities on information and the use of ADP operations . . . has developed to the point where action must be taken to protect the general public," he said.

"We have to have as part of our ultimate federal information policy the ability to fully interconnect competitively procured equipment," he declared.

For if one becomes dedicated to one manufacturer, "you have no way out but to go with [it] and if one manufacturer decided to take a walk for a few weeks, that could bring everything to a complete halt," he said.

The NBS report, "Fiscal Year 1979 Brooks Act Program Issue," distributed last May, identified the interface standards program as the most critical, Ream said. "If this one doesn't go, you might as well forget the others such as device-level interfaces."

Ream planned to send a copy of his letter writtn to Kreps to Sen. William Proxmire (D-Wis.), whose subcommittees on the priorities and economy in government issued a report in 1970 indicating the federal government could save money through interconnection of equipment.

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Draft Reflects Diluted Standard Support

(Continued from Page 1)

as separate mandatory options, the cost of which will be considered in the evaluation conducted as a part of the system or system component selection process," according to the new proposal.

The reason for specifying that a system need only have four interfaces conforming with the standard is to prevent the standard from serving as a basis for sole-source procurement on the number of channels offered by various mainframe makers, according to Harry S. White Jr., associate director for ADP standards at NBS.

Verification of operation of the interfaces in conformance with this standard must be provided, through demonstration or other means, prior to the government's commitment to acquire the system, the new proposal states.

In installing a system with none of the standard interfaces, the government must obtain contractual assurance that the "required number of interfaces conforming to this standard can and will be supplied at any time during the designated life of the system at specified cost to the government."

Regarding modification of systems, the old proposal specified that the standard interfaces should be included on equipment added to or replacing gear that originally met the standard specifications.

Acquisition Alternatives

The new proposal, however, specifies only that "acquisition alternatives that comply with this standard shall be considered competitively with other alternatives, so as to meet the government's data processing requirements at least cost."

These alternatives shall include "those available through exercising the contractual options for interfaces conforming to this standard which were established at the time of initial system acquisition," the proposal continued.

Subject to Review

The new proposal indicates the standard shall be subject to review by NBS within five years after its effective date, "taking into account technological trends and other factors, to determine whether the standard should be reaffirmed, revised or withdrawn."

The conditions under which a waiver may be obtained were shortened under the new proposal to simply "heads of agencies are permitted to waive the requirements stated in this publication. However, such waivers shall be coordinated in advance with NBS."

The effective date of the new proposal is Oct. 21 of this year compared with the originally scheduled Jan. 1, 1978.

Written comments should be sent to White at the Institute for Computer Sciences and Technology, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234.

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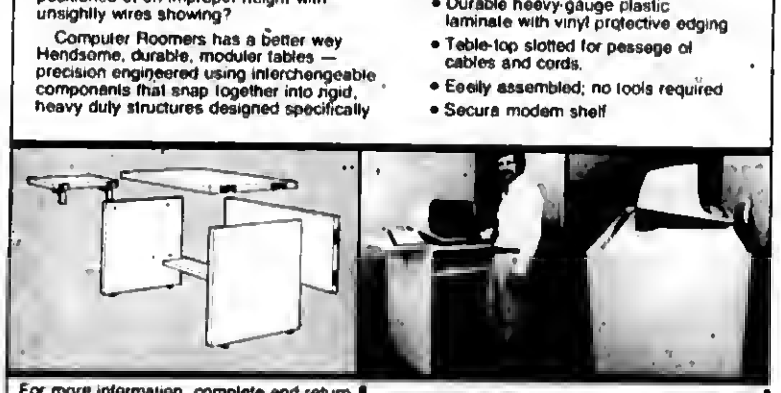

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Agent Cited in Data Theft

(Continued from Page 1)

Mexico and also planned to sell the data to others, according to the indictment.

He and Lambert planned to use data from the DEA to identify prospective importers, purchasers and distributors of drugs as well as possible government informants and the status of current investigative efforts, according to the indictment.

Lambert allegedly accessed the Naddis system three times — on July 8, 19 and 21. As of July 28, he had printouts on five individuals, the indictment said.

The Naddis system, based on an IBM 370/155, requires entry of an access code from a terminal. Once on the system, the user has access to all stored data, a DEA spokesman said.

Lambert normally had access to the type of data involved in the charges against him, the spokesman added.

Lambert has been suspended without pay from the DEA pending resolution of his case, a DEA spokesman said.

Both men entered pleas of not guilty before the U.S. District Court here following the grand jury indictment. No trial date has been set and the two are out on bond, court sources said.

Attorneys for both Lambert and Girard declined to comment on the case.

Jury to Hear Corporation's Defense

IBM Foiled in Bid to Ring Down Forro Curtain

By Molly Upton
CW Staff

SAN FRANCISCO — IBM will finally have a chance to practice its defense tactics before a jury in an antitrust case — Forro Precision, Inc.'s suit against the corporation.

Judge Ray McNichols has denied IBM's motion for a directed verdict, placing the responsibility for the finding of guilt or innocence in the hands of the jury.

The case is not based solely on antitrust grounds. It also includes charges by Forro that IBM interfered with its business while investigating alleged trade secrets thefts.

IBM's counterclaim charges Forro with unlawful market presence and misappropriation of trade secrets.

Commenting on McNichols decision, an IBM spokesman said: "We recognize that [directed verdicts] are rarely granted. We have every confidence in our defense and the merits of our counterclaim."

Two other antitrust cases brought against IBM by Greyhound Computer Corp. and California Computer Products, Inc., and heard by juries received directed verdicts.

The Greyhound decision was recently overturned and the case ordered back to trial [CW, Aug. 29]. McNichols' ruling in the Calcomp case is being appealed.

The only other antitrust case in which IBM presented its defense was brought by Telex Corp., but that was heard by Judge A. Sherman Christensen without a jury.

Forro dropped its claim under Section 1 of the Sherman Act but is continuing to press for damages under Section 2, a Forro source said.

To expedite matters, Forro and IBM have stipulated what the market was and IBM's share, rather than having expert witnesses give their versions, he continued. IBM defined the market as the worldwide electronic data processing and services mart and estimates it has 35%, he added.

Forro is seeking damages of $2.5 million to $9 million.

If the jury finds IBM guilty of antitrust violations, Forro would be entitled to treble damages. Punitive damages could be awarded on some of the other counts, the spokesman explained.

The trial is expected to end soon, he said.

Examiner Picked To Search Files

(Continued from Page 1)

tain information."

In this order — his third directed to the subject — Edelstein expressed his frustration over being faced with attempting to bring about a resolution of this controvery.

Previous Orders

The subject of the LBMI and PBMI files has come before the court twice before on (Sept. 19, 1975 and Nov. 30, 1976) and both times Edelstein has ordered IBM to produce the information.

"While there is no question that [IBM] has undertaken to produce information to [the] plaintiff pursuant to the court's orders . . . the court is not persuaded that the production that has been forthcoming from IBM comports with the spirit and intent of those orders," Edelstein wrote in his order of last month.

Thomas D. Barr, IBM's lead counsel in this case, claimed that "I have personally and continually assured [the Justice Department] that IBM has made prompt, full and complete production under that [Nov 30, 1976] order . . . [The Justice Department] has plainly not looked at what it has and earlier [its] counsel have explicitly rejected what its new trial staff members now want. This whole matter has been placed in the hands of the most junior of plaintiff's counsel. They do not — and really cannot be expected to — understand the material which they have been given.

"If they had reviewed the material with which they have been furnished and understood it, I believe this motion would not have been made," Barr wrote in an affidavit filed with the court.

By asking for an examiner, "plaintiff no longer even wants the responsibility of asking for what it wants," Barr continued. An examiner would be "nothing more than a court-appointed assistant to help the department do the job it can and should do for itself."

Last November, Justice Department attorneys requested that an auditor be appointed to determine whether IBM has the information it was seeking. At that time, Edelstein determined such an appointment was unnecessary. In his most recent order, however, he determined that "the conduct of defendant and the highly technical nature of the production . . . presently constitute 'exceptional conditions' warranting the appointment of an examiner."

Isaacs' power as an examiner will be broad, giving him access to all files, documents and employees of both parties. He will then file a report with the court. Either party may appeal the report, however.

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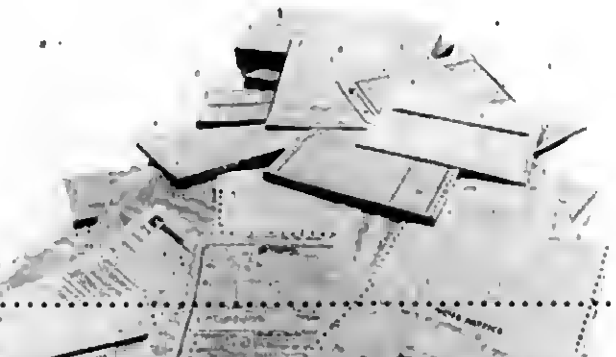

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Report Charges NCIC Has Not Proved Worth

(Continued from Page 1)

Some of the criticisms in the report were invalid and some were wrong; in addition, the scientists failed to acknowledge the need for a high-speed method of detecting wanted persons and stolen goods in a society in which criminals can be very mobile, the FBI officials said.

"The system creates a high risk of detection" for criminals, according to Frank B. Buell, the FBI section chief in charge of NCIC operations. "There's just no question about it."

But the scientists involved in the inspection found otherwise. Included in Sipi's task force were Daniel D. McCracken, who chaired the task force and is vice-president of the Association for Computing Machinery; Joseph. Weizenbaum, professor of computer science at MIT; and Dr. Myron Uretsky, director of the Management Decision Laboratory at the New York University Graduate School of Business Administration.

Rep. Don Edwards (D-Calif), a former FBI agent who heads the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, helped arrange the meeting between Sipi and the FBI officials responsible for NCIC, according to John J. Kennedy, director of the task force.

Edward's subcommittee, which has oversight responsibilities for the FBI, will hold hearings beginning Sept. 29 to discuss NCIC operations in hopes of educating members of Congress about the system. The computer scientists on the task force and FBI officials will be among the witnesses appearing.

No Regular Audits

The Sipi Task force found there is no regular auditing of NCIC data and procedures by a relatively independent auditing authority. Currently, each state audits its own Computerized Criminal History (CCH) Information.

"Neither the FBI nor any other agency except the submitting state audits what goes into the system and how it goes in," the report stated. The task force added that "independent audits, both announced and unannounced," are crucial to maintaining data accuracy and integrity.

Further, there have been no studies, evaluations or reports which give hard data on the benefits to criminal justice as a result of NCIC, the task force said.

NCIC downtime is "excessive," the task force concluded following its July 12 visit to the installation. There are about 30 hours per month of unscheduled downtime and about two hours to three hours per month of scheduled downtime.

"Although the system has 94% uptime . . . this would be an unacceptable record in most commercial enterprises," the task force pointed out.

The FBI plans to request funds for some "costly equipment upgrading designed, in part, to solve this problem of downtime," the report added.

The Sipi group also commented on the FBI's methods of editing old records out of the system. "Expungement from the system does not mean true expungement of a record," the report said.

NCIC necessarily maintains backup tapes and a log for system reliability purposes, the study noted. However, because backup tapes and a log exist, "expungement" from NCIC "really means that the expunged data is not available on-line, but does exist on tapes that are kept at FBI headquarters," the report stated.

One of the side benefits of not completely editing old data out of the system is to defend law enforcement personnel from lawsuits by pointing to data that was previously maintained in NCIC, the report said. At least eight lawsuits resulting from the use of NCIC information have been filed to date, one involving the Operations' section chief.

The task force found arrest records remain in the system without updating of the outcome of the arrests. "As the system is now operated, a person will have an arrest record maintained indefinitely in CCH whether or not he is ever convicted in a court," the report noted.

Describing the NCIC correction and updating procedures as "cumbersome," the task force expressed the belief that people should be informed periodically if a record is being maintained concerning them, a practice not followed at present.

"There are serious security and privacy considerations when between 6,600 and 7,000 terminals can access NCIC nationwide," the task force said. "As the number of terminals increases, with a potential of 45,000 local, state and federal criminal justice user terminals, the opportunities for abuse also increases."

Despite nearly six years of CCH operation, only 11 states are participating in that portion of NCIC by providing some input; of these, only two states provide the system with all their arrest records, the report said.

CCH records make up about 16% of the total number of NCIC records.

Traffic Lights Waste Gas

(Continued from Page 1)

50% fewer delays, about 25% greater fuel economy and 50% higher vehicle speeds than a pretimed signal system.

TMC experimenters created the traffic models with a Control Data Corp. Cyber 74 system at the University of Minnesota here. Besides the 145,000-word mainframe, the all-CDC configuration included a Model 405 card reader, Model 501 line printer, a seven track Model 607 tape drive and a Model 844/21 disk drive unit.

Honeywell obtained the data on which the Berkeley and Los Angeles models were based from highway studies conducted by the California Transportation Department, which in turn forwarded the information to the FHA. Data for the UTCS model was collected by the FHA itself, which conducts its own highway studies in the Washington area.

To ensure the accuracy and reliability of their data, both the California Transportation Department and the FHA hired trained traffic engineers to supervise their studies, according to Lee Sanderson, director of research and development at the TMC.

Although it recommended the report as a guide in planning urban traffic control strategies, Honeywell cautioned against generalizing its test results to other localities. The test results "are heavily dependent upon the specific types of traffic scenarios studies," the report warned.

Six Experiments

In the first of their six tests, experimenters attempted to gauge the effect of one- and two-way streets on gas mileage and traffic conditions. Using a computer model of Washington's UTCS network, they found that, compared with two-way streets, one-way streets averaged 25% higher speeds during peak traffic periods and 19% higher speeds in off-peak hours.

This greater traffic flow translated into an 11% and 13% rise in fuel economy during off-peak and peak periods respectively. The experimenters attributed the improved gas mileage to the one-way streets' fewer stops and shorter delays.

In a second experiment, Honeywell researchers performed a similar comparative analysis of a conventional pedestrian movement system and a pedestrian scramble system, which allows walkers to move in all directions across an intersection, including diagonally. A computer model of the Shattuck-Alcatraz intersection showed the scramble system provided 35% to 48% less fuel economy than the conventional pedestrian system and slowed auto traffic 66%.

Another of the six tests used simulations of the UTCS network and Los Angeles' Hawthorne Blvd. to assess the effect of various traffic signal cycle lengths on gasoline mileage. Using a software package developed by the British Road Research Laboratory, the experimenters found cycle lengths that optimize traffic flow are shorter than cycles that optimize gas mileage.

The researchers also observed that lengthening the intervals between signal changes increases both traffic delay and fuel consumption.

These findings confirmed earlier studies of the impact of cycle lengths on fuel efficiency and traffic flow rates, the report noted.

In a test relating gasoline mileage to traffic congestion, computer simulations of the Washington UTCS network showed average vehicle speeds dropped from 12.8 mile/hour to 11.6 mile/hour and then to 8.6 mile-/hour as auto volume jumped from .75 to 1. to 1.25 times nominal levels. As traffic density increased, fuel consumption efficiency declined 22%.

Experimenters noted similar results for computer simulations of the Hawthorne Blvd. network, Honeywell reported.

Tests on the impact of exclusive bus lanes, meanwhile, showed that buses "cause a degradation in overall performance." In simulations of the M St. network, experimenters found that removing a traffic lane from general use decreased vehicle speeds 18% to 45% and gas mileage 15% to 37%.

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For Efforts as DP Educator

DPMA Picks Couger 'Man of Year'

By Don Leavitt
CW Staff

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has chosen Dr. J. Daniel Couger, professor of computer and management science at the University of Colorado and a regular *Computerworld* columnist, as its 1977 Computer Science Man of the Year.

The award is given in recognition of outstanding contributions to the field of computer science, the DPMA said. This year's presentation will be made during Info/Expo 77, the association's annual conference, on Oct. 12 in Washington, D.C.

Previous recipients of the award, originated in 1968, have included Capt. Grace Hopper — the DPMA's first "man of the year" and Dr. Gene M. Amdahl, founder of Amdahl Corp., who was last year's winner.

Couger earned his award largely because of his influence on the development of computer-oriented curricula in collegiate business education.

"Couger has had more impact on the improvement in education for future managers than any other single individual in the U.S.," according to his nominators.

When Couger entered the teaching ranks in 1965, after 13 years in industry, he was appalled by the lack of computer content in the business school curriculum. His national survey in 1966 indicated that only 11% of all accredited schools of business required computer efficiency of students, according to the DPMA.

After that, Couger exhibited a "missionary zeal" in bringing about a change. A survey earlier this year showed that 94% of all accredited schools of business now require a computer proficiency, largely a result of Couger's effort, a spokesman said.

Couger brought about this change through a four-phase program: 1) writing a book, *Computer and the Schools of Business*, which contained guidelines on adopting and expanding computer curriculum within budget constraints; 2) conducting faculty seminars for more than 1,000 educators representing more than 300 schools of business, on the advantages of computer use in their classes; 3) developing the *Computing Newsletter for Schools of Business*, subscribed to by more than 600 schools; and 4) writing the manual *Fortran for Schools of Business*.

Couger served as associate dean of the University of Colorado's school of business between 1968 and 1972, having joined the faculty at the Colorado Springs campus in 1965. Just prior to that, he was chief of computer plans and controls at Martin-Marietta Corp.

Author of five books and coauthor of five others, he is a member of various DP and educational associations and has lectured in 33 countries.

He received a distinguished faculty award from the University of Colorado in 1975 and in 1973 was awarded second place in the selection for the Dow Jones award, presented each year by the American Association of Collegiate Schools of Business for innovative curriculum among all U.S. schools of business.

Couger now is serving on the editorial board of three professional journals and is coeditor of a series of books in business data processing, published by John Wiley and Sons, Inc. He continues to edit *Computing Newsletter for Schools and Business*.

He is an international lecturer for IBM and has served as consultant for IBM, Control Data Corp., Dow Chemical Co., Hewlett-Packard Co. and NCR.

Couger is listed in *Who's Who in Computing*, *Who's Who in the West* and in *Outstanding Educators in America*.

Dr. J. Daniel Couger

IBM Fails to Appeal Ruling on Greyhound

ARMONK, N.Y. — IBM has failed to take advantage of the 14-day period in which it could have appealed the decision ordering the Greyhound Computer Corp. antitrust suit against it back to trial [CW, Aug. 29].

Its only remaining option now is to petition the U.S. Supreme Court.

The firm has not decided whether to go to the Supreme Court, a spokesman said.

IBM could have filed an appeal for a hearing before the entire panel of the Ninth Circuit Court of Appeals' justices or for a rehearing by the three justices who issued the opinion.

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Decide Not to Compete

Vendors Protest Pre-Bid IBM Order in Dallas

By Jeffry Beeler
CW Staff

DALLAS — About a year before this city began accepting ~~bids~~ on computer systems for its new city hall, a city official apparently ordered $2 million in data processing equipment from IBM.

As a result, Burroughs and Honeywell Information Systems scrapped their plans to vie for the contract and never bothered to submit bids.

Univac also declined to bid on the contract and asked the city to rebid the system as a package. Assistant city manager Jim Favour balked at that suggestion which, he claimed, would give IBM's rivals an unfair competitive edge.

Since Aug. 1, when it officially began accepting bids for the system, the city has received proposals from IBM and three other vendors — Control Data Corp., Itel Data Products Corp. and Thomas Nationwide Computer Corp., a third-party leasing firm.

City officials will not award a contract until they have finished evaluating all four systems and have submitted their recommendations to the city council for review. City manager George Schrader said he expects a decision from the council by Oct. 1.

The controversy arose after spokesmen for both Burroughs and Honeywell charged that Roy Allen, director of data services here, placed a position order for two IBM 370/148s a year before the city began taking bids from other computer vendors.

'No Obligation'

Allen replied, however, that in asking for a position order he was not obligating the city to take the IBM equipment. He argued that he was merely trying to ensure he could obtain the systems on time if the city later decided to use them.

For this reason, Allen said he did not have to clear the IBM position order with the city council, which must approve all municipal purchases of more than $10,000.

Despite Allen's assurances, Don Emrick, Burrough Corp.'s branch manager, said the position order effectively eliminated vendors like Burroughs, Univac and Honeywell from competition for the city hall contract. None of the three firms submitted bids on Aug. 1, and Burroughs and Honeywell never received bid requests from the city on July 11:

In a letter to Schrader, Wayne Howard, a Univac account executive, complained that Allen's actions had discouraged all vendors but IBM from competing for the city hall order. Howard also claimed that even before issuing any bid requests for the prospective computer system, city hall officials had had their new building, which will open in January, electrically wired to meet only IBM specifications.

The wiring decision proves the city had already selected its computer vendor before issuing its recent bid requests, Howard added.

Allen claimed, however, that the new building will be able to accommodate both CDC and Itel Data Products equipment in addition to IBM units.

Request to Start Again

Arguing that the city's restrictive contracting practices had deprived the community and its taxpayers of potential benefits from the computer industry's latest technological developments, the Univac account executive asked Schrader to withdraw all existing bids and start the bidding process over again.

Burroughs' Emrick admitted he becomes "irked" when local and state government agencies apparently preselect their computer equipment instead of opening their contracts to competitive bidding.

Allen denied, however, that the city had preselected IBM as its DP contractor. Besides sending bid requests to various computer vendors, the city solicited proposals through advertisements in daily newspapers, he said.

Although CDC bid almost $800,000 lower than IBM for the CPUs, the Minneapolis-based firm did not include the cost of disk storage devices in its estimate. IBM bid about $1.6 million for the disk units, compared with Control Data's bid of $836,000 for the mainframes alone.

Though Favour rejected the idea of rebidding the city hall systems, he did agree to discuss the contract question in a meeting last year with Univac representatives and two other municipal officials — Schrader and Mayor Robert Folsom.

Univac routinely requests meetings with top local officials when negotiating contracts with city governments, Allen claimed.

Minnesota 11th State To Enter FBI System

WASHINGTON, D.C. — Minnesota has become the eleventh state to enter and update records in the FBI's Computerized Criminal History system.

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Sociologist: Computers Widening 'Power Gap'

By E. Drake Lundell Jr.
CW Staff

TORONTO — "The gap between the powerful and the not-so-powerful will tend to widen as computer use grows," a sociologist told a session at a recent conference here.

Elihu M. Gerson, president of Pragmatica Systems, Inc. and a former sociology professor, said this effect of computer use raises two problems — first, how to control or eliminate the negative impacts of computers and, secondly, how to provide "some minimum level of access to computer power" for all members of society.

"As with any other technology, control over computers and their impacts tends to follow lines of authority and cleavage which already exist," he said.

"Thus, the most general effect of computer use is to increase the relative advantages of some groups vis-a-vis others," he added.

Gerson called this effect the "Matthew Principle" after the passage in the Bible that states: "For unto everyone that hath shall be given; and he shall have abundance: but from him that hath not shall be taken away, even that which he hath."

Help Powerful

As an example of how computers help the powerful, Gerson cited the case of a firm with over $1 billion in yearly sales. Such a firm can "afford to use elaborate computer systems to support complex market analyses, automated production lines, flexible pricing structures, highly detailed cost-effectiveness studies and many other profit increasing activities."

But its competitor with only $10 million in annual sales can afford only a small amount of computer power and few sophisticated applications.

"Similarly, a government agency concerned with minimizing the expenditure of public money (or maximizing the collection of taxes) can bring very substantial information processing technology to bear on the problem of identifying and eliminating ineligible clients from welfare roles.

"Even the most egregious abuse of individual welfare benefits will not support the computing power needed to monitor a government agency's operations," he said.

"Most of the problems associated with computer use have been with us in one form or another for many years, and perfect computer systems and procedures will not eliminate them," Gerson said.

"Privacy and security, reliability and accuracy of accounting, civil liberties, quality of work life and similar topics have long been subjects of concern; the importance of the computer for these areas is in the way in which computer-based systems can multiply the speed and scope of the intrusions, errors and impositions which people suffer," he added.

Because of this, the need to control or eliminate negative impacts of computer systems becomes political.

"We must consider not only the problems caused by improperly designed or implemented systems, but the distribution of advantages conferred by computing power as well," he said.

Gerson suggested the impact of computing "be measured in terms of the changes in relative distribution of resources brought about by computer use. Thus, every application and system would be assessed in terms of the advantages and disadvantages brought about by the system to each party that has some contact within the system."

For example, if an electronic funds transfer (EFT) system reduces float by $1 billion, "then the EFT system has, in effect, transferred $1 billion from banking customers to banks," he said.

Traditionally, costs and benefits of computer use have been assessed from the point of view of the purchasers of computer equipment and services; the measurement of effects has been in terms of dollars, Gerson said. With his system costs and benefits would be measured not only in terms of dollars, but also in terms of time, skill and morale, he noted.

"Time, like money, is a resource which is unequally distributed in social organizations," he pointed out. "One of the most notable impacts of computing technology is the power of the computer to rearrange the distribution of time in organizations." Computerization "may make significant changes in the pace of rhythm of other activities," he added.

These temporal changes will have both negative and positive effects, he said, noting that while some applications may eliminate drudgery, they may also reduce the number of jobs.

"Computers play an equally significant role in the redistribution of skills," he said. They often increase the range of skills available to an organization, but at the same time" reduce or eliminate the opportunities of individuals in the organization to develop new skills."

Question of Morale

The impact of computers also has to be assessed from the viewpoint of morale, according to Gerson. Effective systems may increase morale, he said, by making work easier and more convenient; poor ones decrease morale by creating more inconveniences than they eliminate.

The indirect effects of computerization on morale are also important, he indicated, including the possible reduction in interpersonal contact after computers are installed.

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The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

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DP Service Keeps Farmers Abreast of Finances

By Jeffry Beeler
CW Staff

RICHMOND, Va. — Take a good look at the farms you pass the next time you take a drive through the countryside. Those old bastions of tradition and rustic simplicity are finally about to enter the age of computerization, and when they do almost every farmer but Old MacDonald will feel the impact.

Of course, disk drives and printouts are still a long way from replacing red barns and silos as mainstays of rural Americana. But the move toward increased farm computerization is already under way, and — in this state at least — the trend is sure to continue if Stephen Dennehy has any say in the matter.

Dennehy, a 22-year-old agricultural economist, works as a field representative of the Virginia Agribusiness Management Association (Vama), a state-funded agency organized in 1974 to encourage increased computer use among the estimated 35,000 Virginia farmers who stand to benefit from such equipment.

Each working day, Dennehy travels the back roads of 13 Tidewater Virginia counties in an attempt to recruit new customers for Vama's computerized farm management accounting system. For an annual fee of $300 per subscriber, that service provides farmers with the detailed financial statistics that Dennehy says growers need if they are to compete successfully in this era of increasingly sophisticated farm equipment.

Subscription Process

To subscribe to the service, farmers merely spend about half an hour completing a prepared income and expense report, which they mail on the 10th of each month to Vama's administrative headquarters in Lynchburg. There, the questionnaire data is keypunched and entered into a 256K-word Honeywell Series 60 Level 66 time-sharing computer at Lynchburg's Fidelity American Bank.

Other peripherals in the Vama computer configuration include a Honeywell Model 500 tape drive unit and four Honeywell printers, including two Model 300s and two Model 200s.

Ten days after the income and expense reports arrive, the computer generates monthly financial statements that provide farmers with detailed records of their personal and business credit, cash flow, labor costs, current net worth and other matters of financial interest.

Once a year, Vama's computer system also generates depreciation schedules and profit/loss statements that include dozens of expense breakdowns like costs per acre and costs vs. revenue.

Reporting Eased

Dennehy credited this wealth of computerized accounting data with simplifying the preparation of farmers' federal income tax reports.

Each line on the system's monthly and yearly financial statements is numbered to correspond to a similar line on the standard 1040 federal income tax form.

When the time comes to file his return, a farmer merely transfers the information on his Vama financial statement to the corresponding slot on the 1040 form.

Dennehy also credited the computerized accounting system with improving farmers' chances of obtaining much-needed bank loans. "The day is gone when a banker can tell how a farmer is doing simply by going down to his place and inspecting his crops," the field representative said.

Little Acceptance

"Farmers are traditionally the worst bookkeepers in the world. What we're doing is offering them the same management tools that people in every other business have had for years," he said.

Thus far, however, the system has won precious little acceptance among its prospective subscribers despite its advertised advantages, Dennehy conceded.

He attributes the low acceptance rate in part to a longstanding rural bias against computers. Many farmers are reasonably satisfied with their financial situations and question the need to rock the boat, he explained.

There isn't a single single-
that can touch Tandem in

To begin with, we're twice as good. With multiple processors. It's as simple as this. On-line means on-demand, and one processor won't do. Because any processor, even one of ours, can fail. And if that failure occurs during a peak period of transactions, you're out of business while it's down. And out of luck if you miss your re-start point or clobber your data base. And out of control if you lose or duplicate the transactions in process when the failure occurs.

You need a NonStop™ System.

Tandem has built the world's first multiple processor system, designed from scratch in both hardware and software, to provide non-stop processing—even during a failure—with no penalties in the speed, capacity, throughput or memory utilization of the system.

And it can grow without penalty. Starting with a basic two processor system, users can add processors, memory or terminals incrementally all the way to a fully expanded system of sixteen processors supporting 2048 data communications lines, with individual files of up to four billion bytes fully supported by a comprehensive data base management system. But the best part is that you never have to reprogram. Ever. Your Tandem NonStop System just gets bigger and better. At remarkably low cost.

Why the big ones fail.

The big mainframes are expensive to begin with. And even they can fail. Which can leave you high and dry in the on-line environment. But there are other difficulties with the big numbers, too. Of prime consideration in the on-line world, they offer very limited throughput for their price. And by the time you've hung a lot of communications lines on them, they suffer a derating which makes their performance even less attractive.

And whereas you may eventually need that kind of horsepower in your on-line system, chances are it's an expensive overkill at the outset. What you need is a system which will do the job efficiently on the way in, and grow as your needs grow, in modest price increments. It makes the big systems people wish they were more flexible.

One mini just won't make it.

Minis have made a name for themselves, justifiably. But in the world of on-line, where needs keep growing, the one mini system just can't cut it. With the architectural limitations inherent to a single mini system, growth can build system overhead so fast you'll grind to a halt before you know it.

And strap-ups will kill you.

The answer might seem to be to strap two processors together. One goes down, and the other takes over. Right? Wrong. It's not that simple. System software for a single processor system won't run on the strap-ups. And the fate of any transactions-in-process at the time of a failure is unknown. As is the state of any records being updated. And growth beyond the original system capacity is well nigh impossible.

What you really need is the one multiple processor system designed for multiple processor operation. Tandem's NonStop System.

The four major "on-line" considerations.

When anyone is considering an on-line system, regardless of size, there are four primary points to consider. Throughput. Availability. Data Integrity. Transaction Protection. The system must be able to handle the job. It must be there when you need it. You must be sure of the integrity of your data base. And you must be sure you don't lose or duplicate a transaction. Even during a failure. No single processor system anywhere can provide that assurance. It takes a multiple processor system designed for the on-line environment, and Tandem is it.

For better throughput, spread the files.

We built the Tandem NonStop System with geographic independence of programs and files. They're handled automatically under Enscribe, our Data Base Record Manager. And instead of having one processor with one bottlenecking channel and a

The Tandem 16 NonStop System is composed of multiple, independent processors with dual redundant communications paths. The unique interaction between Tandem hardware and software assures not only continuous operation, and the integrity of your data base, but also throughput unmatched by any other computing system of comparable cost.

Career Project Extended

NOTRE DAME, Ind. — A University of Notre Dame program to stimulate minority students' interest in technical careers has been expanded and funded for a second year.

The program, which uses computer games and programming, received $58,064 this year from the Committee on Institutional Cooperation Plus/Midwestern Program in Minority Education to support its work with minority high school students.

In 1976, terminals were placed in several Indiana junior high schools; students communicated with Notre Dame's IBM 370/158 by telephone. The program has now acquired its own computers and been extended to two middle schools and a senior high school.

Designs Program for Vendor

Pupil Trades Tacos for Terminals

MINNEAPOLIS — Last summer, Bonita Heid waited on customers at a taco stand. This summer, the St. Cloud State University senior designed a computerized program to maintain a sequence of labels while and after a program is being debugged.

Heid was one of four St. Cloud students engaged in an experimental internship program between the Minnesota university and Data 100 Corp., a manufacturer of computer terminals based here.

For her work, the 21-year-old mathematics major received $4 an hour, up to 16 hours of college credit and a chance to work in a computer company while she's trying to decide on her career. "We goet three months to see whether we liked this kind of work," she said, "and they got three months to decide whether they liked us."

Apparently the company did. According to Michael DiPaolo, Data 100's product support manager and the person responsible for initiating the exchange, "we gained the services of four highly motivated people in a vital area — but one that's not always easy to recruit for.

"We always wanted to get at these software projects," he noted, "but our people have always been tied up with larger projects. With our 'new employees,' we finally had that chance."

Like Heid, the three other students — Jeff Schmitz, Bill Hagenbuck and Paul Aubrecht — are all seniors in the school's computer sciences program and will graduate within a year. "That makes them excellent prospects for these jobs later on," DiPaolo said.

For its part, St. Cloud is able to provide its computer sciences students with meaningful work experience. As Robert Johnson, computer sciences and mathematics professor, said, "We are pleased that the students are getting valuable hands-on experience and not just the dirty work."

processor system anywhere an "on line" environment.

fixed priority system, Tandem's NonStop System distributes the work and the files across multiple processors, multiple discs, and multiple channels. Enscribe controls the pattern and the flow for maximum efficiency. Because of simultaneous disc accesses, there's a dramatic improvement in response time. It's one of the performance benefits about a multiple processor system which you can't get on a single processor system.

Ease of programming, by design.

Historically, multiple processor systems have been a bear to program. Not with Tandem. Guardian, Tandem's operating system, lets you write your programs as usual. You can add more processors, or memory, or terminals as you need them. No need to rewrite programs. Ever.

And we make it easy to write the programs in the first place, with COBOL or with TAL, a powerful language designed for fast, flexible programming. The software development tools of this mini-based system rival those of far more expensive systems, and include NonStop operation, data communications, mirror volume capability, full file protection, screen formatting programs, and a host of housekeeping utilities.

When you're thinking "on-line," think in Tandem.

Which means think in multiples. Few, if any, "on-line" systems can be installed and forgotten. The number of transactions, the number of terminals on-line, or the number of applications programs to be run on the system keep growing. Most likely, all three will multiply.

Which is traumatic unless you've started with the one system on the market which can grow with you—even if the growth occurs during the initial configuration phase—without having to start all over again.

NonStop growth and NonStop protection, too.

Because the Tandem System was designed for NonStop operation in both hardware and software, it offers an extraordinary measure of protection against a failure in any processor, I/O channel, disc drive, or in the software. No other system offers this measure of assurance.

When a failure does occur in any segment of the system, its back-up counterpart completes the task, without a hitch. Since all programs are geographically independent, and the operating system both distributes and monitors all work-in-process. recovery from a failure is instantaneous. There is no restart; no backing up to a hopefully safe point.

The system monitors its own operations, performing all tasks in a distributed fashion across the multiple processors. Even when a CPU goes down, another CPU is immediately aware of the failure and picks up the task in process and completes it. No data and no transaction need ever be lost or duplicated. The integrity of the data base can be fully protected. It is truly unusual, but it's one reason why we say no single processor system anywhere can touch us in the "on-line" environment.

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Guardian: Operating System.

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Automatic re-entrant, recursive and shareable code.

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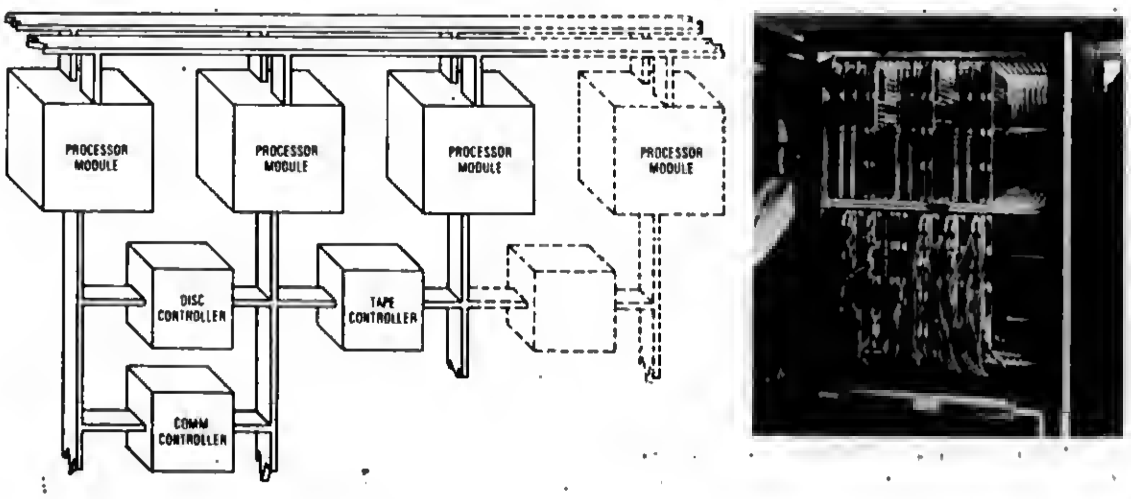

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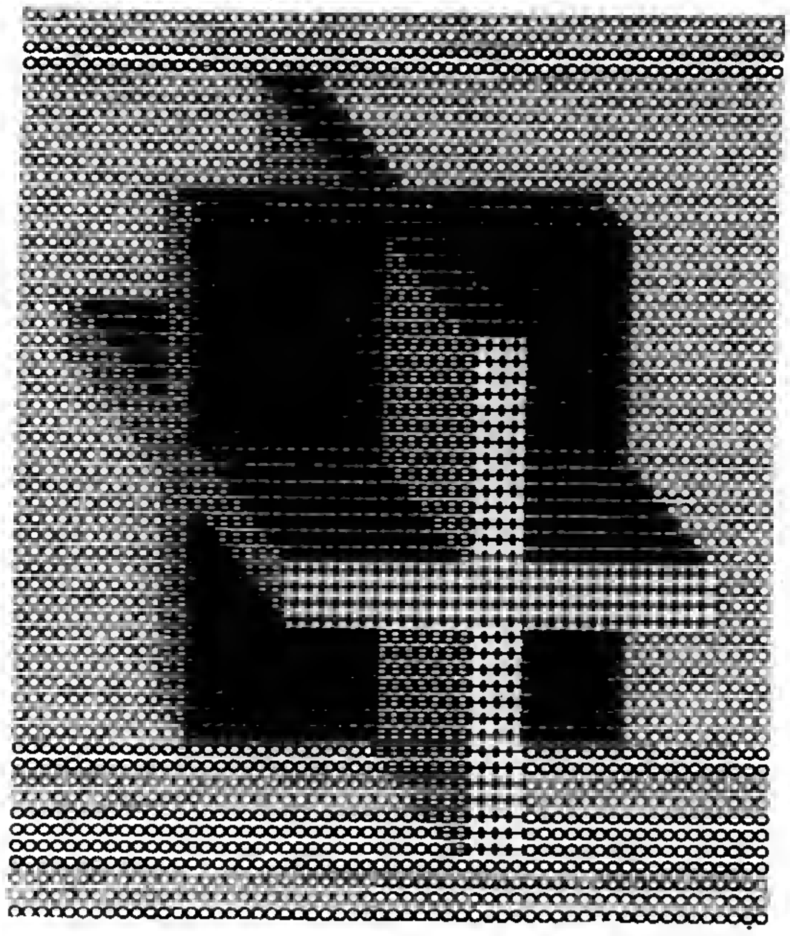


KUBUS-SERIE by Klaus Bassett, a professor at Grafischen Fachschule in Stuttgart, Germany. An example of a definitive series exploring programmatic variations of a square. (Courtesy *Computers and People*, August 1975)

By Nancy French
CW Staff

NEWTON — Is computer art Art?

The answer, oddly enough, is no, according to Edmund C. Berkeley, editor of *Computers and People*, a magazine that has sponsored a computer art exposition in its August issue for 15 years.

"All my opinions about computer art are expressed in my August editorial," Berkeley responded when approached by *Computerworld* for an interview.

Besides, he said, "I don't think it matters whether I like it or not, I think it's more important what ordinary people think about it." And ordinary people, according to Berkeley, don't find computer art very satisfying.

In his editorial, "Computer Art and the Eye of the Beholder," Berkeley contends people without any loyalty to the computer find computer art "boring" — "only avant-garde editors of computer books seem to want copies of the art now and then," he noted.

Why? Because of its "abstractness." Computer art fails to "represent common objects and scenes;" further, it fails to show objects portrayed "in their detail and historical perspective."

Finally, the artists don't overlay their "pictures" with any "representation of emotion, mood or artistic interpretation," Berkeley said.

"People understand and enjoy art far more when they can look at the entire scene and find many interesting and challenging things to observe. The basic quality of great pictures is that one can look at them over and over, and for a long time, and discover still more delight and interest — and 'beauty.' The beholder can say, 'I like that. It makes me think and dream. It speaks to my condition.'

"It seems to me that for a beholder, interest and delight in art depend on recognition of objects and scenes; richness of detail, history and impressions; all suffused by an artist's deft technique for conveying invisible emotion and feeling. Thus a rich collection of messages, intellectual and emotional, are conveyed from the artist to the beholder, and beauty becomes a joint enterprise for them both.

Do I hear an argument?"

Yes — from Grace Hertlein, art editor of *Computers and People* and editor of *Computer Graphics and Art* who "respectfully" replied to Berkeley's comments and also defended computer art — its status as an art form — and offered some suggestions for improvement. Hertlein, who describes herself as "an artist turned computer artist," is an associate professor in the Department of Computer Science at California State University in Chico.

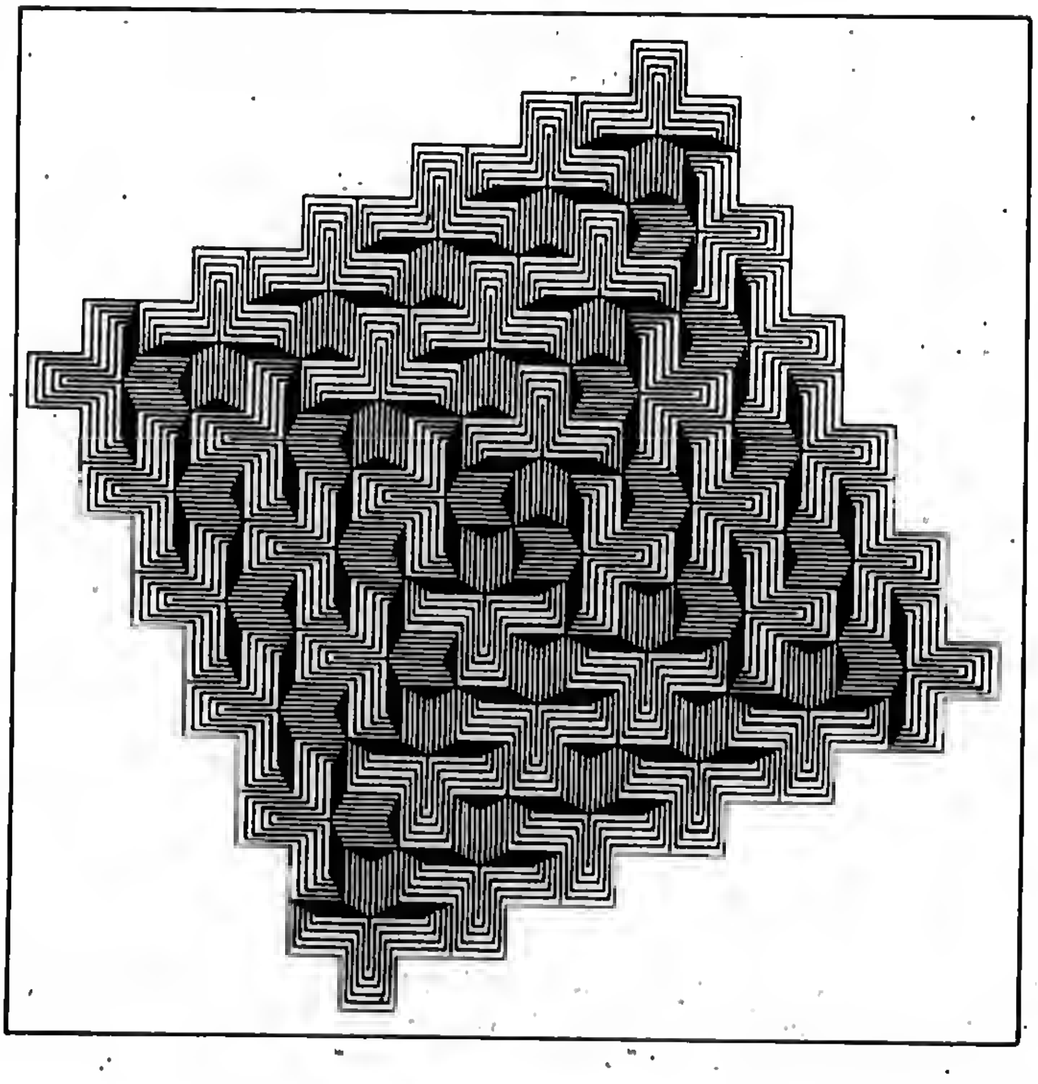
"Edmund Berkeley is absolutely right that the beholder should be stimulated, moved and repeatedly moved, that we should discover more and more of interest delight and beauty in a work of art," she believes.

"But 'beauty' is an overworked word. We need to find new words. The drawings of Leonardo da Vinci are not beautiful, but they are moving, revealing and fascinating.

"Man will continue to find his face and his world meaningful in the future. Therefore these patterns of man and his world should be included more in computer art," she agreed.

However, Hertlein defends computer art as a "young" art form. "It has gone from an accidential happening, practiced by physicists and systems analysts, to become an art that is popular with many kinds of people" in about 15 years, she pointed out.

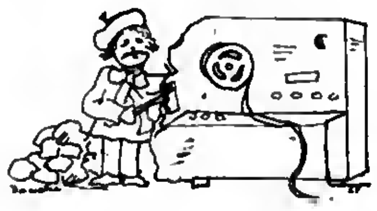
ZUP TZE 33 by Paul Shao and Kenneth F. Dunker, professors at the Department of Architecture at Iowa State University in Ames, Iowa. An example of modular optical art, ideally suited to the computer and derived via a transformation algorithm. (Courtesy *Computers and People*, August 1977)



Computer art is characterized by "a great deal of pattern manipulation." Designs are input and varied "via transformations and randomizations" which result in "interesting visual patterns. These might make nice wallpaper or wrapping paper; but too often they are not exciting and moving enough to be considered as art," she said.

She also conceded that the types of designs input into the computer are often "aesthetically wanting." Too often one limited design is repeated topsy-turvy. As such it "tickles our senses briefly; but it hardly ever accomplishes more than this surface, brief pleasure," she explained.

New Masters



"Often I see in print and exhibitions work that I would return to a first semester computer art student to develop more fully," Hertlein said.

But, is it fair to compare an art form that is only about 15 years old with art that is thousands of years old? Hertlein asked. Cave art goes back 17,000 years. If one chooses to disregard cave art, Egyptian and Mesopotamian art still date back as many as 4,700 years, she noted.

Further, "hundreds of thousands of artists have practiced Art, contrasted with a few hundred who are currently engaged in producing computer art," she added.

As for Berkeley's contention that computer art is "flat, and two-dimensional, made up of many lines, lacking solidity and lacking perspective," Hertlein agreed with his assessment and even called it "sound." Much computer art possesses these qualities because of the types of computer systems used to create them.

For example, she said, "point-to-point programming encourages linear, flat designs of a lean, minimal nature. Few systems have digitizers and tablets. Many graphic systems do not have a curve-fit routine and therefore forms are excessively angular."

Further, "a good proportion of graphic systems do not have a user-oriented 3-D routine for artist use," she added.

An Evans-Sutherland Frame Buffer system that allows the computer artist to literally paint colored computer art with dimension and solid-appearing patterns costs $250,000, she said. And few installations can afford such a system.

But there are other limitations, too, according to Hertlein. "Not all campuses and installations have generous computer graphics systems. Many have only printout capacity."

Furthermore, programming languages for computer art "are not highly developed, and often they are not transportable," she pointed out. "An ideal graphics language as such does not exist, but it might someday."

In computer science "the name of the game is to make a device or system do what it was not intended to do. Artists are becoming more knowledgeable about system limitations, and they are becoming more knowledgeable about programming and about art in general," she said.

Hertlein agrees that "representational" art, which features recognizable patterns from the world of man and nature rather than abstractions, is more satisfying, but often commonplace to the point of being boring. She defends the forms resulting from science and mathematics as "equally viable" as representational forms.

"Since mathematics and science are part and parcel of computer art, the innumerable forms from these disciplines are highly desirable as design sources," she argues.

Hertlein, in contrast to Berkeley, feels "a special delight in perceiving the instantaneous moment." The historical rendition of an event such as the eroding of a mountain, for example, is "another pleasure."

The prints of the famous artist Maurice Escher are an example of both. "Perhaps we need to be more open about deciding what computer art should and should not be lest we follow the example of manual art with its diverse, fashionable dogmas," she said.

Hertlein doesn't disagree the point that her fascination with computer manipulation of numbers and images is the basis for her fascination with computer art. "We are like the doting parent or teacher" — doting on computer art because we are computer people, she admitted.

"If we were to see the same art accomplished manually, we might find it quite uninteresting. We may be too fond of the computer and whatever it can do," she added.

Berkeley expressed little fondness for computer art that looks like something "a man could do." He did agree, however, that computer art that is too complex for a man to do manually can be interesting and attractive.

But computer art is often better than people think, according to Hertlein. More than 90% of computer art illustrations found in texts and even in catalogs and brochures for computer art exhibitions are printed in black and white because of cost. Without seeing the originals in color "we cannot fully know the work of art."

Another factor militating against the acceptance of computer art as Art is the general "antitechnology movement in this country," according to Hertlein.

"Because of the lack of exposure to computers and technology itself, many individuals believe technology debases mankind and art," she said, but "because of our experience, we know that it is the purpose, the method of using technology, that makes the difference. The person behind the computer is very important.

"As an artist turned computer artist, I have encountered a great deal of genuine animosity from manual artists. But I have encountered a great deal of encouragement from computer people."

As an example, Hertlein described an incident that occurred while she was hanging an exhibit of works by 250 invited international computer artists in a university gallery in Los Angeles. The works were large, well matted and framed; the majority were in color.

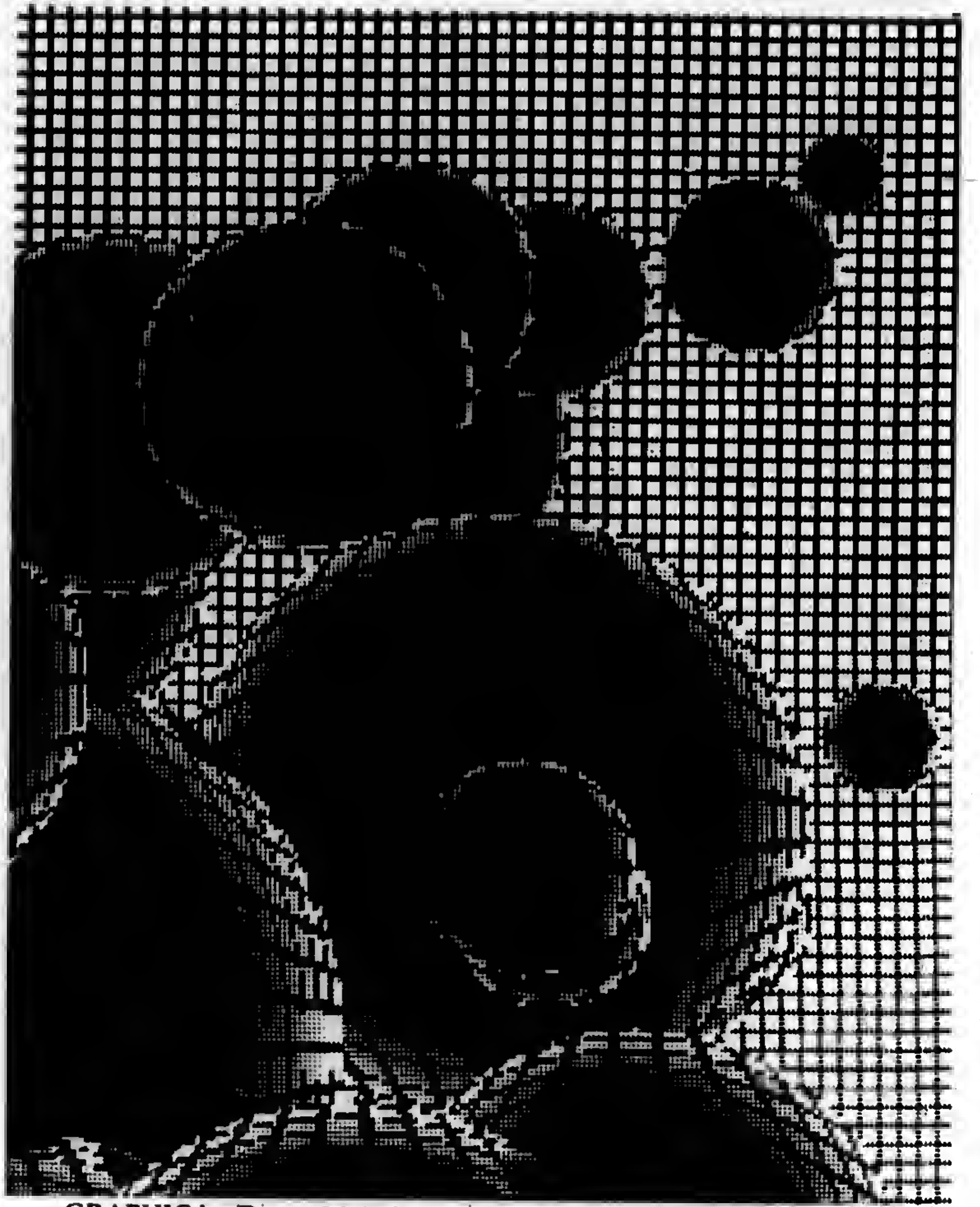
People were already gathering, and "words of praise flooded the gallery. As we completed our work we put up a large sign: 'International Computer Art.' It caused a furor. The word 'computer' brought forth damning comments, replacing the accolades volunteered a few minutes earlier," she said.

"As visual arts chairman, I remained behind to informally lecture and answer questions about art. However, no explanations, no comments could undo the apparent prejudice of the beholders."

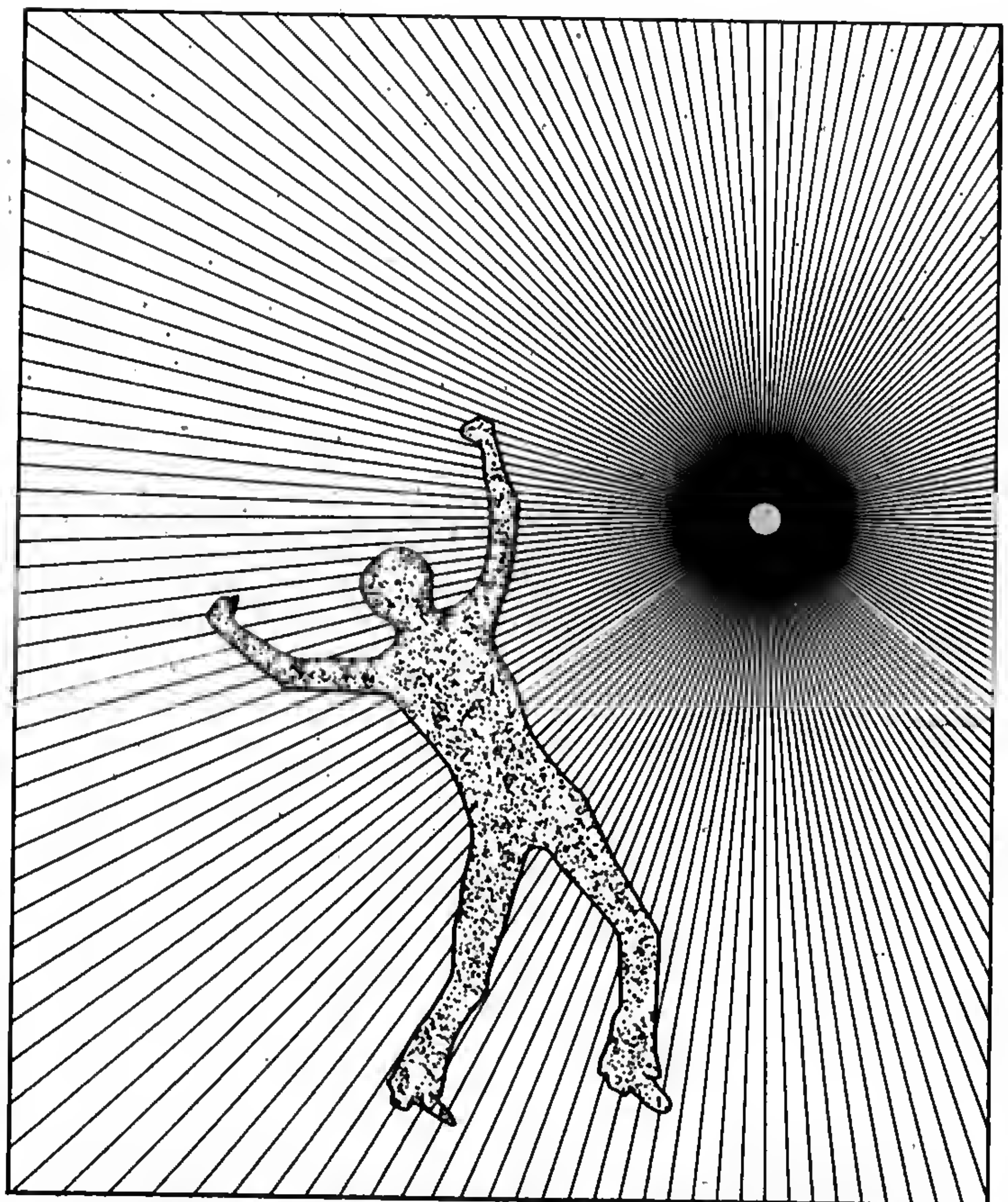
Only when computer art is displayed in exhibitions and galleries with acceptance of the "computer" as an art medium, just as watercolors and oils are accepted, will computer art be evaluated fairly, she said.

The potential of computer art to emerge as a full-blown accepted art form is clear." I believe the breakthrough of computer art as a popular art form is likely to occur within the next years," she said.

Is This Art?



GRAPHIC by Duane M. Palyka, a former research associate and systems programmer at the University of Utah in Salt Lake City, now of New York. From the "Bubble" series in which the artist explores two-dimensional space wth a three-dimensional illusion. (Courtesy *Computers and People*, August 1975)



FALLING MAN by Kerry Jones, a systems engineer with Datapoint Corp. in Nashville, Tenn. A tour de force programmatically, and a social commentary on man and technology. (Courtesy *Computers and People*, August 1976)

New York, Pacific Stock Exchanges Plan Link

By Edith Holmes
CW Staff

NEW YORK — The New York Stock Exchange (NYSE) and the much smaller Pacific Stock Exchange last week announced their intention to electronically access each other's trading floors.

In the meantime, representatives of the Pacific and four other regional exchanges — the Midwest Stock Exchange in Chicago and those in Boston, Philadelphia and Cincinnati — plan to meet in Chicago this Wednesday to discuss the expansion of their own intermarket hookup.

A link between the Pacific Exchange — which had a recent total weekly average of 791,000 shares — and the "Big Board" — with its average daily volume of 22 million shares — would allow dealers to match a buyer in California with a seller in New York, according to an NYSE spokesman.

No start-up date has been projected for the NYSE-Pacific link, and it is not clear whether traders and their customers would be charged for the use of the service, the spokesman said. "An awful lot of detail has to be fleshed out," he added.

The hookup between the "Big Board" and the Pacific Exchange, however, could "evolve into the key element of the national market system called for by Congress," NYSE chairman William M. Batten said.

Batten invited the other regional stock exchanges to join in the link, but the regionals' own system could eventually provide competition to the NYSE plan.

Business Increase Expected

The Pacific Exchange expects the New York-Los Angeles hookup to produce a sharp increase in business for the Pacific Exchange, a stronger competitive position for California-based regional brokerage firms and benefits for investors who would gain access to a broader market, Pacific chariman Edward W. Wedbush said.

It is uncertain whether the Securities and Exchange Commission (SEC) would have to approve the plan, however. An SEC spoksman said the commission will study the pact to assure it is consistent with federal stock trading laws.

At the Chicago meeting on Wednesday, Regional stock exchange officials will take up the expansion of their limited system operated by Weeden Holding Co., parent of stockbroker Weeden and Co.

Weeden has linked the Pacific, Boston and Philadelphia exchanges in a system called "wham" for Weeden Holding Automated market.

Listing 50 stocks and allowing interexhcnage trading, Wham matches buy and sell orders on a first-come-first-served basis and doesn't allow dealers to request that their transactions be made on a specific floor, a spokesman said.

On Wednesday, Weeden will propose that other regionals be allowed to join the system, renamed RAM for Regional Automated Market. The company hopes to make this expanded system operational with a limited list of stocks by October.

Weeden hopes its system will become the single national stock exchange hookup. "Ultimately, all markets could be linked up through RAM," the company's spokesman said.

Cornell Gets NSF Grant For Chip Research Facility

WASHINGTON, D.C. — The National Science Foundation (NSF) has given Cornell University five years and $5 million to find out how much more memory can be packed onto a chip.

The grant provides for the establishment of the first national facility for research on electronic devices with dimensions of less than one micro — about one sixtieth of the diameter of a human hair — and for studying the fundamental properties of the materials used in their fabrication, according to an NSF spokesman.

To be called the National Research and Resource Facility for Submicron Structures, the laboratory will look for better ways to produce tiny patterns that can be incorporated into a wide range of electronic devices. Such techniques will ultimately be used to improve communications, increase computer capacity and make possible advances in the biological sciences.

Dr. Joseph Ballantyne, professor of electrical engineering at Cornell, is directing the initial planning for the facility. He said the technology planned for development in the new laboratory will allow researchers to inrease by 10 times the density of components in an integrated circuit.

In addition to its use in the expansion of the technology in this area, the laboratory will also be employed to train graduate students, engineers and scientists in the field and to stimulate research on submicron structures in physics, chemistry, chemical engineering and related fields, the spokesman said.

Alexander Named HRIS Director

WASHINGTON, D.C. — Boyd L. Alexander, who has served since March as acting director of the House of Representatives Information Systems (HRIS) — the computer and information systems support arm to the House of Representatives — has been appointed the organization's director.

Alexander came to Capitol Hill from the Office of Management and Budget's (OMB) Information Systems Division. He replaced Dr. Frank Ryan, who left the position as head of HRIS to become Yale University's athletic director.

Another former OMB Information Systems Division staff member, Franklin S. Reeder, has been named deputy director of HRIS.

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Now Used to Print Tickets

System Expected to Expand Stadium Services

By Jeffry Beeler
CW Staff

CHICAGO — They might have to wait a while, but managers at Chicago Stadium expect an automated ticket-printing system to eventually expand their range of customer services and cut their production expenses.

Because stadium officials installed it only last October, the minicomputerized system has not yet had a chance to yield either of its expected benefits, box office manager John Stroth explained. "It's a new system, and we're still making design changes in it," he said. "It usually takes a year or two to get everything on a new system working correctly."

But when the system finally does become fully operational in a few months, stadium officials will be able to maintain mailing lists, notify customers of upcoming events and perform other functions and services that previously had been beyond their capabilities, Stroth said.

The system will also allow stadium managers to trim their ticket-printing costs, although Stroth admitted "it's a little too early at this point to estimate exactly what the savings will be."

More Than Enough

When they relied exclusively on outside services for their printing needs, Stroth and his colleagues had to order a full complement of tickets for every event they hosted. Unfortunately for them, many of the events that take place at Chicago Stadium — hockey games, ice shows, rock concerts and the like — draw less than a full house, so, in some instances, stadium officials were forced to buy more tickets than they could sell.

Today, with the minicomptuer system, they buy some of their tickets from Ticketron, the New York-based supplier, and then print any additional tickets in-house as the need arises. As a result, they order only as many tickets as they can sell, Stroth explained.

Before they installed their own printing system, Chicago Stadium managers obtained their customer tickets from a local commercial printer. Although they had no complaints with the printer's service, they concluded that an in-house ticket-printing system, with its ability to perform many extra functions, "was the way to go in the future," Stroth recalled.

Leased from Ticketron for $35,000 a year, the desk-sized computer system manages season tickets, changes customer seating arrangements on request and does billing and promotional mailings in addition to its primary job of printing tickets. Except for the forms cutter, the stand-alone Ticketron 2000 system consists almost entirely of Control Data Corp. hardware, including a 32K-byte Cyber 18 central processor, a Model 1811/1 CRT terminal and a Model 1827/30 line printer.

After the system becomes fully operational, Stroth and his associates plan to replace the configuration's two 250K-byte floppy disk drive units with a much larger capacity drive. This improvement will allow Chicago Stadium managers for the first time to perform several DP tasks simultaneously, the box office manager predicted.

They will be able, for example, to print tickets for one stadium event and at the same time change seating assignments for a subsequent attraction. The existing system, in contrast, can't perform any additional DP tasks while it's printing tickets.

Topic of Distribution Set for HIS Seminars

PHOENIX — Honeywell Information Systems, Inc. will conduct two seminars on the distributed environment and networking for executive and technical personnel in the user community.

The product-independent seminars include a management session of two days and a 10-day session for those with extensive systems experience.

An introductory seminar for upper and middle management will be held Nov. 9-10 in Boston. The tuition is $250, which includes a workbook.

The 10-day distributed environment session is scheduled for Dec. 5-16 in Phoenix. Tuition is $1,250 including workbook, materials and computer time.

Further information is available from Hal B. Becker at HIS, P.O. Box 6000, M.S. K-99, Phoenix, Ariz. 85005.

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Scholarship Aid Program On Small System Itemizes Prospective Funds Sources

By Esther Surden
CW Staff

MANCHESTER, N.H. — Where to get the money to send the kids to college is a common concern of parents today. A nonprofit program run on a small business system at New Hampshire College here is helping to alleviate this burden.

The program is the combined effort of New Hampshire College, which has exclusive processing rights, the Citizens Scholarship Foundation of America, Inc. (CSFA), which is developing the files, and the College Entrance Examination Board, which is responsible for quality control and dissemination of the information to the students, according to Joseph F. Phelan, executive director of CSFA.

The Ford Foundation is also involved via a three-year grant totaling $95,982.

Under the scholarship aid program, an applicant from any of the New England states, Indiana or Minnesota can receive a listing of at least 10 sources of funding for $10, according to William A. Hunzeker, assistant professor at New Hampshire College.

The program is in the process of being expanded to include Illinois, New Jersey and Texas and is expected to cover Michigan, New York, North Carolina, Ohio, Pennsylvania and Virginia in the near future.

The program began in 1972 on an NCR Century 100 that handled all of the college's educational and administrative needs. The growing use of the system for special projects prompted the college to upgrade to an IBM 3/10, which has since been upgraded to a 3/15D.

"At the time we began, CSFA asked several computer companies if this particular thing could be done. Two didn't answer the request for proposal, another company came in with a high bid and IBM said it was nearly impossible to do," Hunzeker recalled.

CSFA then allowed the college to tackle the project. Hunzeker challenged some students to do it and they came up with a program for the NCR Century 100.

The program "worked reasonably well, although it served only the state of New Hampshire and had a very small data base of about 500 sources of aid. It took the machine about a minute and a half to two minutes to put out a list that averaged about 13 sources of aid for each applicant," he said.

When the college switched from the NCR to the IBM system, it also tried to convert the programs. It found, however, that because of the file structure the same functions that had taken a minute and a half to two minutes on the NCR machines now took five minutes on the IBM system.

"But we did such a low volume it didn't make a lot of difference," Hunzeker said.

In 1974, CSFA contacted the college to see if the program could be expanded on a national level. The college rewrote the software and upgraded from the 3/10 to a 96K System 3/15 and changed from Model 5444 disks to 3340 disks. Just last month it upgraded again to the 3/15D.

To obtain the data needed for the scholarship matching, CSFA employs qualified part-time summer help to do actual field work that includes canvassing high schools and colleges, interviewing scholarship sponsors and compiling relevant data.

All input is prepared on diskette on an IBM Model 3741 key entry unit. The source document was designed to be transparent to the person filling it out. A coder goes through his computer-generated code book and assigns appropriate codes to the particular application form, reads from the application form and inputs onto the diskette, Hunzeker said.

"We are going to get away from this now," he noted. When the College Board sends out the application, it will effectively be a code book and "it will make the student do the lion's share of the coding."

The college plans to modify the system to use optical scanning as volume increases.

Zip Code Method

A "sophisticated" program is used to find the members of the data base that meet a particular student's qualifications, Hunzeker said.

"One of the primary requirements for printing an award is geography, so I use the Zip Code method of searching through the data base. I actually have two data bases. The programs split the information entered on diskette into two sources and there is one data base, containing nothing but requirements, that is specially coded," he said.

The requirements data base is searched in a Zip Code order starting with the local level because that's where the student has the best chance of getting funding, he indicated.

"The computer effectively has been programmed to selectively search. Some glitches in the system force it to learn better ways of searching as it goes along," he stated.

The search now takes 15 seconds, including the printing of 20 sources, he claimed.

The system is presently handling about 5,000 students, but has the potential to handle 1,000 a day with "no trouble," he added.

World Bank Supports Colombian Project

WASHINGTON, D.C. — The World Bank here has loaned $60 million to Colombia to expand its telecommunications facilities.

Colombia's Empresa Nacional de Telecommunicaciones (Telecom) hopes to improve telephone service to small towns and rural areas by 95,000 lines, connecting approximately 75,000 additional subscribers to its communications network.

Costing $167.7 million, the project will also involve the installation of microwave radio and multiplex equipment to increase circuit capacity by about 8,800 internal long distance circuits, connecting 2,200 rural communities to the telephone system.

Whither the Weather? Model Might Explain

By Jeffry Beeler
CW Staff

BETHLEHEM, Pa. — Scientists here are using a computer model of U.S. wind patterns to try to find the cause of the recent unfavorable turn in the world's weather.

Developed by a Lehigh University research team, the model could help explain U.S. weather aberations like last winter's record-breaking low temperatures and the prolonged drought that has parched many of the western states.

The computer simulations also could lead eventually to improved short- and long-term weather forecasts and yield knowledge about warming and cooling trends in the earth's climate.

Scientists disagree about the long-term outlook for the world's weather. Some meteorologists contend that recent extremes in the world's weather signal a gradual cooling in the planet's temperature and the onset of a new ice age.

Other meteorologists argue that the slow build-up of atmospheric carbon dioxide from auto and factory emissions will create a "greenhouse effect" that will raise the earth's temperature enough to melt the polar ice caps and flood low-lying coastal regions.

Data provided by the computer simulations here could help reveal which of these bleak predictions, if either, is right.

The research, supported by a two-year National Science Foundation grant, is being conducted by Doctors Alister Macpherson and Peter Hilton, professor and associate professor, respectively, of mechanical engineering at Lehigh University. Dr. Melvin Shapiro of the National Center for Atmospheric Research in Boulder, Colo., is assisting the project.

Macpherson and Hilton have focused their research on the north-to-south shift and other fluctuations in the polar jet stream, a high-velocity current of air that flows from west to east around the world at a latitude roughly coinciding with Boston, the Great Lakes and Seattle.

For several years, the seven-mile-high current of air had shifted northward and brought relatively mild winters to the eastern half of the country. Last year, however, it moved suddenly and inexplicably south and sent winter temperatures plummeting to record lows.

By studying the jet stream, Macpherson and Hilton hope to learn how the phenomenon affects long-term global weather patterns, how it spawns weather fronts and how local meteorological disturbances like severe storms affect its stability. They also hope their work will reveal the cause of the jet steam and answer other basic meteorological questions.

"If we knew where the jet streams come from and what causes them, we'd be 80% along the way toward a good five- or six-day weather forecast," Macpherson explained.

Output Plotted

To achieve these benefits, Macpherson and his associates devised a computerized world model that makes 12-, 24- and 48-hour weather forecasts based on theoretical meteorological data like wind velocity and barometric pressure readings, which the researchers feed into their 128K Control Data Corp., 6400 CPU.

The results of the computer's predictions are generated on two flatbed plotters — a California Computer Products, Inc. Calcomp 563 and a Calcomp 565 — in the form of a map section overlaid with symbols like lines of constant temperature and pressure.

The researchers' configuration also incorporates four CDC disk drive units — two Model 844/21s and two Model 844/41s.

Without some sort of computer model, conducting a sophisticated study of the relationship between jet stream activity and weather conditions would probably be impossible, Macpherson said. He regards improved weather forecasting as the chief benefit of using a computer model in studies of the polar jet stream.

Meteorologists rate the accuracy of their weather forecasts with a standard dubbed the "skill score." "If, for example, weather forecasters predict half an inch of rain and three-quarters of an inch falls, they give themselves 70 points," the mechanical engineering professor explained. The same standard also applies in forecasting wind speeds and other common weather variables.

When predicting weather by hand, meteorologists average a skill score of about 60%, Macpherson estimated. With the Lehigh University computer model, by contrast, the researchers typically achieve a 70% rating.

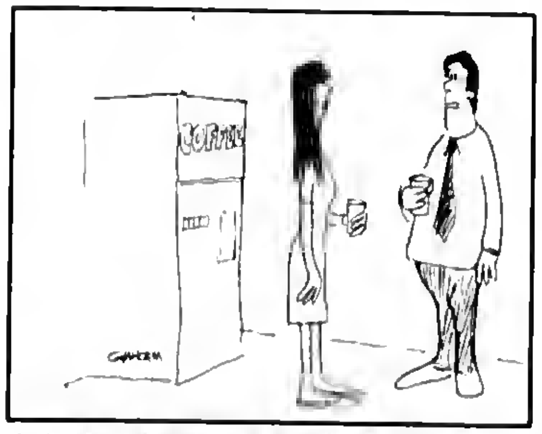
"The computer model we have developed has improved weather forecasting accuracy by about 10%," he added.

North East CMG Sets Meeting Next Week

BOSTON — How to present performance data to management will be one of the topics covered at next week's open meeting of the North East Computer Measurement Group (CMB), according to acting chairman Jeffrey Buzen of BGS Systems, Inc.

The all-day session will take place here next Monday, Sept. 19, at John Hancock Institute, across the street from Hancock Tower.

There will be a $2 registration fee and anyone is welcome. Other details are available from BGS Systems, P.O. Box 128, Lincoln, Mass. or from Buzen at telephone number (617) 890-0000.



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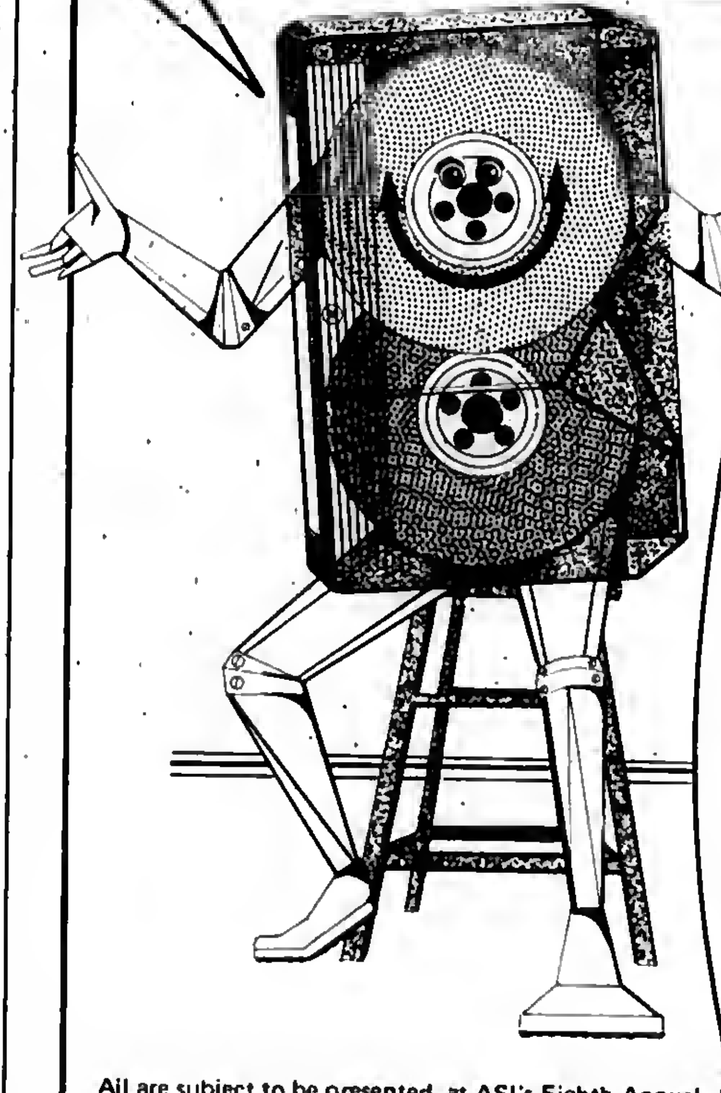

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Programming Course Uses Hand-Held Unit

By Denise Petski
CW Staff

DALLAS – High school students can soon be taught computer programming with a hand-held calculator through a course introduced by Texas Instruments, Inc.

Developed by the University of Denver Mathematics Laboratory, the course is designed for students with no prior knowledge of programming techniques or previous experience with hand-held programmable calculators.

The course format allows a teacher to utilize the materials with individual students, small groups or an entire class. Sections of the course may be used to enhance mathematics or science classes, or the entire package can stand alone as a separate mini-course in programming, according to a company spokesman.

The course will help prepare students in high school and beyond who are interested in careers as computer programmers, since the essential concepts and techniques used in programming calculators are directly related to those used with larger DP systems.

The hand-held calculator is an ideal learning tool for programming because it is immediately available to teachers and students who otherwise would have to wait, after writing programs, for access to a larger computer, according to the company. Also, initial and continuing costs for a computer-based course could be much higher than for one that uses calculators, it added.

The course emphasizes the "natural side" of programming, covering techniques which involve logical thinking and organization of problem solving steps in a straightforward order.

Lesson materials were designed to move students into simple, straight-line programming quickly. Students then proceed to program techniques involving conditional and unconditional transfers, loops and subroutines.

Included with the course is a teacher's guide setting lesson objectives and details, with additional suggestions on the adaptation of programmable calculators to the classroom.

The course will be available this fall through authorized dealers. Texas Instruments, Inc. can be reached at P.O. Box 5012, Dallas, Texas 75222.

National Fire Data Center

WASHINGTON, D.C. – Seven states will begin reporting their fires to the National Fire Data Center at the National Fire Prevention and Control Administration (NFPCA) within the next year.

Awarded assistance grants by the Department of Commerce, the states will use the monies to establish or adapt statewide fire data systems, an NFPCA spokeswoman said.

Delaware, Iowa, Michigan, Minnesota, Rhode Island, South Dakota and West Virginia will divide $112,000 in NFPCA assistance money, using these funds to help develop and operate statewide fire incident reporting systems. The data systems will be developed or adapted to be compatible with those in other states, the spokeswoman stated.

Local fire departments will contribute their fire incident and casualty report information to their states. Statewide summaries of this data will be prepared, and participating local jurisdictions will receive feedback reports.

The center will use the data to produce national estimates and develop a data base for answering information requests from government, industry and the public.

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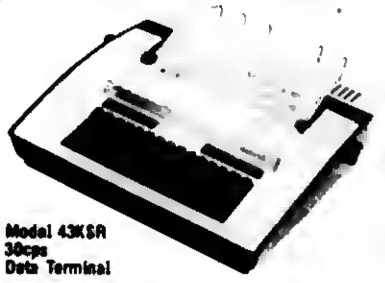

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DP Helps Find Way of Feeding Bangladesh

COPENHAGEN, Denmark — Researchers used computer technology in planning a major new grain distribution network in Bangladesh to help feed that nation's rapidly growing population of more than 75 million, which is crowded into an area smaller than the state of Iowa.

To do so, Operations Analysis Corp. (OAC), a worldwide operations research consulting organization based here, called on Control Data Corp.'s Cybernet Services to conduct feasibility studies on the physical and economic planning of the new grain facilities project.

OAC's objective was to find the best system for the distribution and storage of 15 million tons of grain and to ensure that the grain comes from the production areas and goes to urban areas.

"We wanted to be certain that the new facilities integrated with existing facilities, provided a complete system with minimal capital, operating and transportation costs," Bjorne H. Sorensen, OAC project manager said.

Transportation Problem

Transportation was one of the main problems because many railroads and roads were destroyed in the civil war which ended in 1971. To help beat this problem a task force of experts went to Bangladesh and gathered information about such factors as transportation, costs of building different types of structures, distribution of production, distribution of consumption and entry of imports.

Seventy locations suitable for building storage facilities were selected. Each location had crossroads, railroad junctions or rivers; sometimes all three were available.

In addition, different kinds of storage facilities could be built: steel or concrete silos, flat storage spots or bag-handling facilities. Some existing facilities also could be rehabilitated.

"If your only decision problem was to build or not build at each of these 70 locations, you would have 2^{70} possibilities according to Sorensen. "That is a huge problem."

Fixed Flow Program

In Copenhagen, the analysts chose a fixed flow program developed by CDC to set up their problem. Output from the program showed how much grain should be shipped from each production or import location to each of the potential storage sites and from there to each demand point.

OAC then drew a map showing what the flow should be from the different parts of the country and then recommended the kind, size and location of storage facilities, based on mathematical calculations processed through the Cybernet center here. Its recommendations then were used to establish the distribution network in Bangladesh.

OAC began using Cybernet Services in 1971. Initially, it bought time and developed its own software programs. Today, the company uses a number of mathematical programming, statistical analysis and structural testing programs available through the Cybernet applications library.

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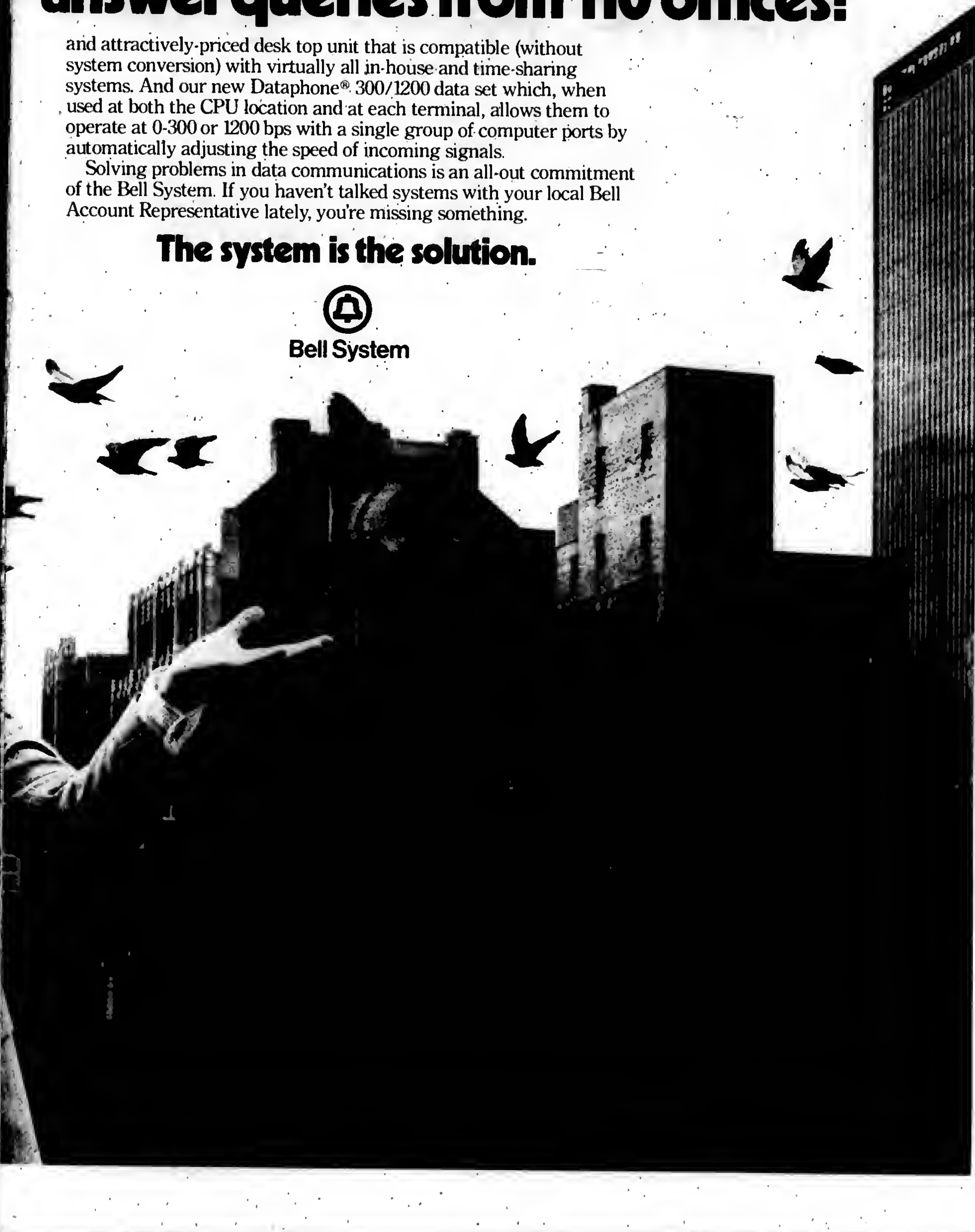

EFT Commission Gains FTC's Foer

WASHINGTON, D.C. — Albert A. Foer, assistant to the director of the Federal Trade Commission's (FTC) Bureau of Competition, has been named a commissioner on the National Commission on Electronic Fund Transfers (EFT).

Foer has been working closely with the commission since its inception, according to FTC Chairman Michael Pertschuk. In addition to possessing an antitrust background, he is known as an expert on privacy issues and has published a study entitled "The Personal Information Market: An Examination of the Scope and Impact of the Fair Credit Reporting Act."

Foer will be a member of the EFT Commission's committees on sharing, competitive impact and consumer issues.

The commission is an independent advisory agency which must report to Congress and the President this fall on its findings and recommendations concerning the development of EFT systems.

On-Line Analyses Defuse Tokyo Traffic Jams

By Ivan Berenyi
Special to CW

TOKYO — A large on-line real time computer system is being used here to analyze traffic flow and prevent the kind of traffic jams that have come to give big cities a bad name.

More than 2,900 traffic lights here have been brought under computer control to date — a number that has doubled in the last 12 months; according to Osamu Nakamura, chief of the Tokyo Metropolitan Police Department's Traffic Control Division.

Computer analysis of traffic flow enables early action to defuse potential jams by reordering the sequence and duration of traffic light changes, according to Nakamura.

Data Collection

The traffic flow data is gathered on-line from more than 3,200 ultrasonic vehicle detectors installed at roadsides throughout the city center. More detailed information at peak-flow pressure points like the famous Ginza or Akasaka Mitsuke intersections comes from 19 closed-loop television cameras, phone calls from officers on the beat, radio-equipped patrol cars and rush-hour helicopter surveys.

All the incoming data is analyzed by a Nippon Electric Neac 2200 Model 375 computer, with 524K-byte core capacity. In the traffic control center an illuminated map of the city center shows in color-codes the changing status of the city's traffic — white for "good flow," orange for slow-down and red for full-scale jam. Visual display units give more detailed information, such as the precise flow of traffic at any one intersection.

Control of the traffic lights is handled by six 64K Neac 3200 process control minis, communicating with the central processor through two 32K Neac 3100 front ends.

Continuous Expansion

"The system is being expanded every year in terms of the area covered, the number of computers installed, intersections controlled, vehicle sensors used and TV cameras mounted. Two of the Neac 3200 computers were installed in the last year alone," Nakamura explained.

The system is a merger of two former traffic services — the 10-year old Traffic Information Center, which used to gather data manually from police officers pushing buttons in police boxes to represent traffic flow; and the Computerized Signal System, set up in 1969 when the first Nippon Electric computer was installed.

The Traffic Information Center data was previously processed by two Technomaster control processors made by Matsushita Control Industrial Co. These have now been discarded, and the Matsushita Macc-7 computer complex, earlier dedicated to coordinate traffic lights along certain routes as a slave to the computerized signal system, was phased out.

Fight Continues Over DP Taxes In Oregon, R.I.

The fight against software taxation in various forms continues in Oregon and Rhode Island.

Oregon Governor Robert Straub has signed into law a bill that exempts software from property taxation by defining it as intangible personal property, according to a spokesman in the tax research bureau.

The new law will be effective Oct. 4. The state has no sales tax, he added.

Petitions in R.I.

In Rhode Island, Puritan Life Insurance Co. has filed two petitions in its efforts to eliminate a sales and use tax assessment for the years 1971 to 1977 on software, according to William W. Fitzgerald Jr., assistant counsel.

Puritan is seeking rulemaking procedure that would eliminate an administrative rule that says software should be taxed as tangible personal property, he indicated.

The firm has also filed a request for a hearing on its own assessment, but has asked that the rulemaking procedure be held first, he said.

The petitions were filed with the state tax administrator.

Distributed Confusion

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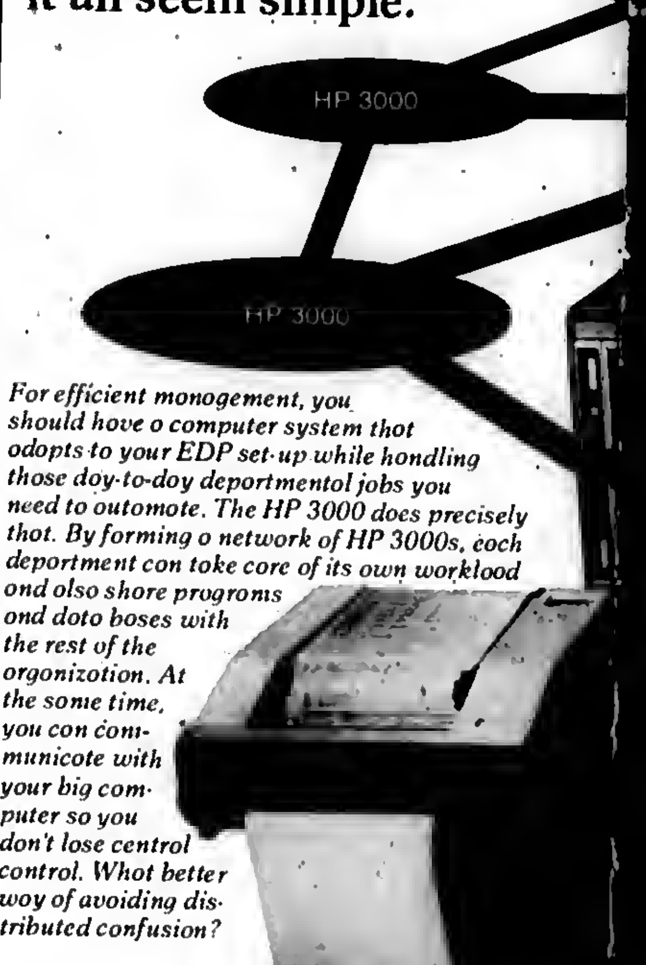

For efficient management, you should have a computer system that adapts to your EDP set-up while handling those day-to-day departmental jobs you need to automate. The HP 3000 does precisely that. By forming a network of HP 3000s, each department can take care of its own workload and also share programs and data bases with the rest of the organization. At the same time, you can communicate with your big computer so you don't lose central control. What better way of avoiding distributed confusion?

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But Agencies Call It Premature

Senate Gets Bill for Earth Resources System

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A bill that would establish an earth resources and environmental information system has been introduced here by the Senate Subcommittee on Science, Technology and Space and is under study by the Carter Administration.

As presently designed, the bill — S. 657 — would make data about the earth obtained by satellites available to the private sector, a spokesman for the Senate Committee on Commerce, Science and Transportation said.

During five days of hearings held this summer, the agencies that would be charged with responsibility for such a system — the National Aeronautics and Space Administration (Nasa) and the Department of Interior — argued that an earth resources and environmental information system for the public is premature and surrounded by too many uncertainties, the spokesman stated.

OSTP Hesitant

The Office of Science and Technology Policy (OSTP), headed by Dr. Frank Press, science advisor to the President, also expressed its reluctance to serve as the coordinating mechanism for the information system, he added.

Other witnesses in and out of government who appeared before the subcommittee, however, indicated they would be enthusiastic users if Congress would establish the system, the spokesman said.

Press has organized an interagency working group with Nasa and Interior representatives to consider the feasibility of the system and the public's readiness for it.

Awaiting the interagency group's report, the Senate Subcommittee considers S. 657 a "vehicle for opening the subject up" and would like to draft a bill that would receive Nasa, Interior and OSTP support, the spokesman said.

"Our whole purpose was to get the executive branch to look at the possibilities of this information system in more than a fleeting way," he stated.

He stressed that when all views are heard, Nasa may not be in charge of the operational end of the system — launching and maintaining the satellites — while Interior handles the distribution of the information collected.

While S. 657 focuses particularly on the Landsat earth satellite program, the information system established could well include data collected by any number of application satellites. As an example, the subcommittee spokesman cited Seasat, a satellite that will be launched next year to monitor the oceans, providing valuable fishing and weather information.

Not only has the time come for this data to be publicly available in this country, there is a need for it internationally, he stated. The U.S. might find such an information system a valuable offering to the international community at the conference on science and technology for development which the United Nations plans to hold in 1979.

SCDP Relocates

MEMPHIS, Tenn. — The Society of Certified Data Processors (SCDP), formerly located in Hudson, Mass., is now headquartered here.

Its address is Suite 532, 2670 Union Extended, Memphis, Tenn. 38112.

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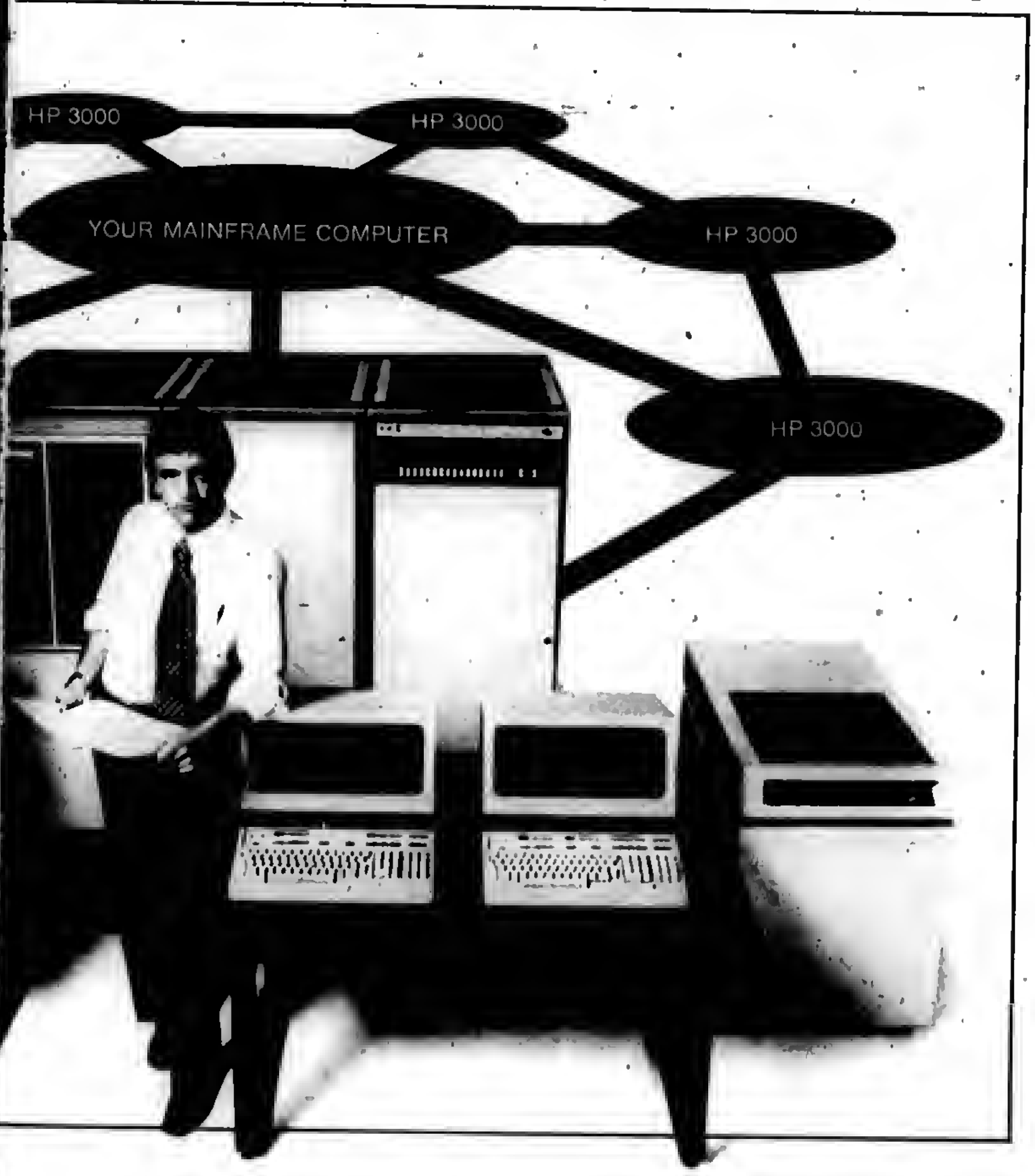
The HP 3000 has an extremely effective data base management capability. With its help, the computer will generate forms, titles, page and column headings, data sorted by categories, subtotals, totals and averages. And, through DS/3000 software, you can call up any HP 3000 data file in your network.

Data base management on the HP 3000 has proven so efficient that it was recently named to the Datapro Software Honor Roll, placing it among the 38 top software products in the country.



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So if you want to take the confusion out of distributed processing, now and in the years ahead, call your nearest Hewlett-Packard office listed in the White Pages. Ask for a Computer Systems representative. Or write for more information to Bill Krause, Hewlett-Packard, 11000 Wolfe Road, Dept. 304, Cupertino CA 95014.

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Editorial

Another Wait for Users

The Bell Data Network (BDN), AT&T's answer to the public packet network, has been expected for some time. But now a document has surfaced giving details of the projected network offering as of November 1976 [CW, Sept. 5].

The BDN document is most interesting for what it does not say. The "Service Offering Statement" made no mention of an X.25 compatibility, although that may still be included when the network is announced.

The exact date BDN service will begin is believed to have been postponed several times within AT&T. Reportedly, the features of BDN will depend heavily on the findings of the Second Computer Inquiry.

The BDN document, using the most liberal interpretations of what constitutes communications processing, includes data entry, inquiry/response, remote job entry and message distribution. If AT&T can convince the Federal Communications Commission (FCC) these are functions associated with communications, then BDN will probably be announced shortly afterward.

But a definition of what constitutes communications processing is a key issue in the reopened Computer Inquiry. Vendors of DP services and suppliers of equipment are expected to protest the Bell concept, which would relegate DP functions and their associated software to the regulated domain of the telephone company.

A decision in the FCC inquiry could take some time. In the meantime, AT&T will be under pressure from other emerging packet networks to make a move toward BDN. Whether this will mean an initial limited version of the BDN service is known at this point only to the top brass at the phone company.

There are some industry experts who watched AT&T's Transaction Network Service (TNS) with great interest. These sources saw in TSN the first steps toward a public packet offering, even though TNS was aimed at a limited financial-type user.

The firm most directly affected by BDN would be Telenet Communications Corp., which depends on AT&T long-line facilities to provide its packet-type service.

Meanwhile, data communications users will have to wait until the regulatory roadblocks are debated and disposed of one by one. Whether BDN will be offered in the form outlined in the Bell document is open to question. AT&T may have to perform some significant fine tuning on the concept if the FCC proceedings are not favorable to its pleadings.

The issue of whether BDN will become a regulated phone company service strikes at the very heart of the computer/communications boundary dispute. There is little doubt that AT&T has the resources and ability to offer a BDN service. However, whether it will be allowed to do so is up to regulators and, perhaps after that, the courts.

Trying to define the limits between the nonregulated DP industry and the regulated communications industry is certainly an important issue. But customers who could use the BDN service to optimize their business telecommunications operations get little comfort from waiting for the regulatory machinery to grind slowly on to another "final" solution.

Data Past

Five Years Ago
Sept. 13, 1972

WHITE PLAINS, N.Y. — IBM raised the rates for systems engineering (SE) services, some field engineering (FE) services and the minimum monthly maintenance charges on selected pieces of equipment. A 5% to 10% price rise for SEs affected the greatest number of users, while the higher rises for FE services affected only customers with purchased machines.

— — —

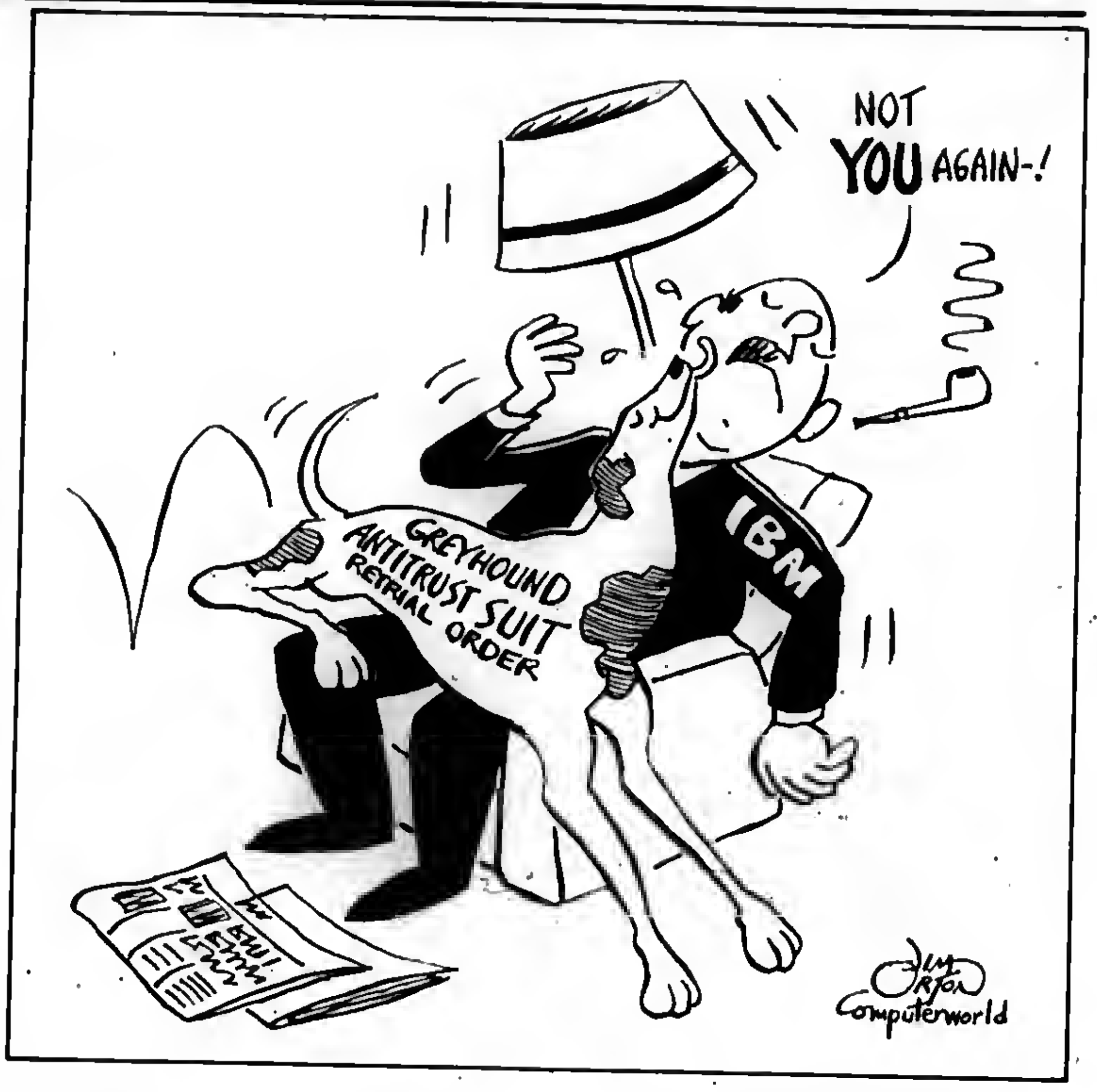
SALT LAKE CITY, Utah — Univac introduced a programmable front-end processor that could support non-IBM terminals as well as replace IBM communications controllers. The 3760 communications controller, said to be plug-compatible with IBM 360/370 mainframes, marked Univac's initial offering of an IBM replacement.

Eight Years Ago
Sept. 17, 1969

LEONIA, N.J. — Compuscan, Inc. announced an optical character reader capable of learning new characters or entire alphabets online. The Model 370 was priced at $900,000.

— — —

CUPERTINO, Calif. — Information Storage Systems, Inc. introduced the ISS 714, a disk drive "fully compatible with IBM's 2314." The company claimed the 714 had an average access time of 32 msec compared with 60 msec for the 2314-A1 and 75 msec for the older 2314 system. Startup time of the ISS 714 was said to be one-third that of the 2314.



Letters to The Editor

Spectra Not IBM-Compatible

I was astounded by Jerry Nesmith's claim in the Aug. 29 issue ["Credit Should Go to RCA"] that in 1970 RCA had a CPU that would run IBM operating systems. The Spectra 70 had a different interrupt system, I/O architecture and storage protection system from the IBM 360, and the later 3, 4, 6 and 7 were just repackaged Spectra 70s.

If RCA ever had a compatible CPU, it was never part of the commercial product line.

Seymour J. Metz
Rockville, Md.

Iverson Inventor of APL

The Aug. 22 issue provided good coverage of the recent International Federation for Information Processing (Ifip) congress held in Toronto. I would, however, appreciate it if you would publish a correction to the report of the planning session of which I was chairman.

The article ["Inconsistent Data Seen Major Snag in Planning"] stated I was one of the inventors of APL. This is patently incorrect. APL had only one inventor, namely Kenneth Iverson.

Ian P. Sharp
President
I.P. Sharp Associates Ltd.
Toronto, Canada

He Couldn't Be More Wrong

After reading Joe Rigo's response to the Certificate in Data Processing (CDP) exam challenge issued by Ken Lord [CW, Aug. 29], I couldn't be happier that Rigo is not one of my employees. At his age, he should be striving to learn new concepts and methods instead of sitting back on his laurels and blaming his lack of knowledge on old age.

Without knowing anything about the exam's content, Rigo stated that tests like the CDP exam "are for kids just out of school." He couldn't have been more wrong.

The questions on the CDP exam should not be compared to "sixth grade lists of major exports of South American countries," any more than the questions of the bar exam should be compared to Dell Crossword puzzles. I suggest that Rigo learn what the test questions are like first-hand before he stereotypes the exam.

I cannot imagine anyone saying he knows just enough for today's job and will learn what is necessary for tomorrow's. Such people are more aptly called vegetables. They are not the type of people who have helped in the advancement of data processing. If it were up to people like Rigo, I'm sure most of us would still be wiring 407 boards.

Yes, poor Rigo is quite correct when he says he would flunk the exam. And that is one more indication of the exam's merit.

David T. Guidos
Torrance, Calif.

Three Cheers for Rigo

Hooray for Joe Rigo!

As a "computer professional" who started on the Univac I in 1957 and quit the Association for Computing Machinery in protest many years ago when a college degree was added as a requirement for new members, I'd like to play on Joe Rigo's team.

Ken Lord's letter was amusing and rated a chuckle. Joe Rigo's reply deserves a cheer.

William Kohlbrenner
Guilford, Conn.

(Other letters on Pages 32 and 33.)

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

A Case of 'Disconnect'

Reader Ponders Conflicting Life, Job Goals

By Jack Stone
Special to CW

Painter Hoffman's letter about DPers' relationships with their families [CW, Aug. 8] has had a profound effect on those with whom I've talked. But, no one has expressed his feelings so sensitively as the writer of the following letter:

Dear Jack:

Painter Hoffman's letter brought tears to my eyes. Having just lost, through divorce, a wife and family of 20 years, I think I'm qualified to comment on the DPer's side of the disconnect.

I'll grant Painter's conclusion that those of my ilk tend to think remotely and to subject feeling to insatiable scrutiny. I'll even grant her frustration when her spouse ran out of gas on Christmas night. Just now, Jack, am I forcing myself to again observe the sunrise over the pastel houses, the color of flowers strewn along the winding path and the sounds of birds and insects carried on the breezes.

But most importantly, after 20 years of marriage, during 15 of which I have been involved in this industry, I'm finally beginning to again see people for what they are, get to really know them, and, in the process, get to like myself again. After two decades of marriage and a decade and a half in DP, I've finally asked myself, "Is that all there is?"

In so doing, logical thinker that I am, I have to ask how it happened. What turned a youth so full of promise into a person whose very ideas are subject to open attack? True, many can be blamed, but I do not overlook myself for that blame, for where I should have been strong, I conceded, and where I should have been gentle, the strength — too much of it — came out.

Like many a young American male, I was programmed for "success" by my parents who had not achieved a degree of success that satisfied them. It was important, as far back as I can remember, to become educated, to have a nice house, to be a family man and — and I can still hear my mother's words — to "make something" of myself. In retrospect, there have been times I sincerely wished to have followed my initial impulses to drive a truck.

But the programming was absolute, and one so programmed is attuned to grab each opportunity and to exploit it to the fullest. Such was the case with me. My chance to get into DP came along in a flash, and I took it, totally — I cannot now say blissfully — unaware that for the next nearly two decades someone would be constantly waiting to extract the pound of flesh.

True, I was interested. True, there was magic in knowing it was my program which made the lights blink and the tapes turn. What started as an opportunity became a fascination, an all-consuming passion to conquer this intellectual Mount Everest. On the other side of this seemingly insurmountable cliff stood the promise of Shangri-la.

The Human Connection

Little did I realize that my intellectual efforts were merely the satisfaction of the needs of others to exploit my potential to move that 16 tons of coal every day. Conquest of each successive peak was followed by reward, a reward which carefully and neatly disguised that I was selling my soul, byte by byte, to the company store. And for each conquest I made, there were two more waiting to be tackled. And always there was somebody more concerned with how you climbed the mountain, rather than the fact that you did it at all.

As the rewards and "success" came, the box systematically closed in, forming a harsh trap from which there was no escape. On the one hand there were the needs for shelter and support of a growing family, which, when coupled with an ever-increasing set of economic demands, never quite permitted one to get solidly established or to get ahead.

On the other hand, there were the constant granting and withholding of reward, privilege, opportunity and exploration afforded by employment. But they could never be separate. Without the latter, the former was not possible by itself, and it was certain that the demands of the former would increase, not decrease. What was one to do?

Well, what I did was to become mobile, first in terms of employment, as only change in employment could satisfy the rate of growth required to satisfy the economic needs. All the traditional values of stability, loyalty and adequate compensation for earnest endeavor could simply not be satiated by remaining in one place. On the one hand, it had to come faster than it was coming, while on the other, I found one artificial roadblock after another be it a degree, mode of dress or whatever. Granted, some I created for myself. My only regret is that I didn't retreat when I began to recognize it. Again, however, I could not, for I had been programmed for responsibility.

My ex-wife, though not expressing it in a manner that was clear to me, recognized it in 1968 when she said it was here where the roots would

(Continued on Page 24)

A Workable Approach

Don't Risk Getting Sacked for Being Ethical

If an employer asks his computer people to do something illegal and they refuse, they should not be fired. Nor should they be fired if they refuse to do something that falls in the gray area between right and wrong or if they refuse to do something the employer said he would not ask them to do when he hired them.

But exactly how can a DPer be sure he won't be sacked if he refuses? That's the problem that has sunk so many DP codes of ethics — and it's the key to DP responsibility.

The Taylor Report
By Alan Taylor CDP

But there are other items to be considered before a system of DP responsibility can be set up. The first is the recognition by employers and employees alike that there are dangers in DP and that they are dynamic.

Some old dangers will dissolve as we adopt new methods or as it becomes economical to test for gray areas. Other dangers will be born, or identified from time to time, and sometimes end up in legislation.

More often, however, they will be restricted to specific professional and industry codes and methods of handling DP. And a responsible DP system has to recognize both that such dangers may exist without having been pinpointed as illegal and that responsible DP should face up to this as well as illegal DP activity.

Future Scenario

The way this approach might work could be as follows: A programmer goes into a job interview, and everything is OK. When the final details are worked out, he is told to go over to Personnel to arrange for his physical and get his "DP Policy Statement."

The personnel officer gives him a form (see box) rather like one of those "disclosure" statements about interest of loans or deliberate overbooking on airlines that have become so popular of late.

The prospective employee is asked to sign the policy statement after reading it, and it becomes as much a part of his agreement with the firm as anything else. It gives both him and the firm restricted rights to have DP checked for dangers and to have the work performed without ethical worries.

If he later runs into problems, this policy statement spells out what his procedure is, how much — if at all — he can complain and safeguards his job. Yet it permits ethical issues to be raised.

Of course, there are some visible effects that would go down to the computer room and the programmer's desk. Whatever the company policy is, the DP designer will have to review the design to check that it conforms with the policy and to include in the documentation details of how such a check was done so the people who later run the system can tell whether a situation really was checked out or simply overlooked. And management instructions regarding the conditions in which some gray area parts can be run will also have to be part of the design documentation.

Similarly, the operational area will have to know where these

(Continued on Page 24)

Attatulish, Inc. DP Policy

The Attatulish DP policy represents the corporation's understanding that the use of computers sometimes has unwelcome side effects and recognizes the corporation's intention to minimize or eliminate those side effects whenever found.

It has therefore adopted the provisions of the [insert name of trade association] guidelines, a copy of which is attached, and expects all of its employees to be guided by them whenever any question of computer operations is raised or when any invasion of privacy by computer is suspected.

In addition, your participation is invited at the annual seminar on computer responsibility in Attatulish held in January.

Issues not otherwise resolved quickly that could involve any unprofessional use of computers should be brought to the attention of the director of [insert appropriate title] at any time.

This policy statement, incorporated as part of an employment contract, could go far in establishing a workable and effective set of professional ethics.

Reader Bemoans Family, Work Conflicts

(Continued from Page 23)

be put down and they wouldn't budge. But that didn't stop me. The pressures were still the same. If you had a project, you had employment. If you didn't, that was it. And all the time there were increasing needs to be met. It wasn't the frills which were required — it was the necessities.

Then, there came a point where it became perfectly obvious that no employment in and of itself would ever provide them. In the need to do even more, I went into business for myself. Yes, I dressed it all up in "objectives," ambition, self-reliance and independence. But the simple truth was that I was caught in a vice from which there was no escape — at least no honorable escape.

My creativity was thwarted and the pressures allowed no time to relax. The only difference was that tho hills I now climbed were hills of my own making and the coal I moved was in reality my own coal, except that it was continually being consumed faster than I could mine it. The demands of working for oneself now intensified the work and travel schedule and the home situation worsened — to the point that we all began to ask, "Is that all there is?"

Creativity has a way of getting out. Thwarted creativity has a way of coming out in a very negative manner. That happened to me.

And now the bubble has burst, and I'm left — alone — to pick up the pieces and to try to put them back together again in some semblance of reason. I'm deprogramming myself now, but the burden of knowing that it wasn't in time to be of benefit to my wife and kids is heavy indeed, as they must now make the same mistakes I did. The pressure is still there, but it is more remote, and my sense of responsibility demands that for the rest of their young lives I must continue this way, if only to ensure their survival until they can find a way to stand on their own feet and make their own mistakes.

Letters to Stone should be oddressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Woshington, D.C. 20007.

By that time, my service to this industry will itself have reached two decades, and at that age I'll be just another throwaway to an industry which has concentrated on youth, and I'll emerge a person much worse for the experience. But hopefully, I will emerge a person. I haven't been a person for a very long time.

Jack, if you decide to use this letter or any part of it, I urge you to implore your readers to let their spouses read it with but a simple plea: Stop! There has to be more than this. Find a way, within or without this industry, to prop open the trap before it springs shut, for if you ever do escape, you do so at your own peril. It would be far better to ensure that you never even get into the trap.

Policy Allows Ethical DPers

(Continued from Page 23)

items are and understand them as well as it understands the other operating instructions. But, by and large, the impact on the installation will be minimal. It will just tell where the DPers stand with the employer, and prevent them from getting sacked on the one hand and keep the computers from being used unethically.

Only one last question remains — and that is as to why DPers really need ethics. The answer seems to lie in the siamese twin relationship between the system and programming areas, which decide everything and do nothing; and the operators, who do everything and decide nothing.

Neither group really wants to be involved in something unethical, but until the two sides are put together after the decisions are made, the problem can be easily overlooked.

Only by having some procedure such as outlined here can everyone involved in computers know they can be ethical without risking being sacked.

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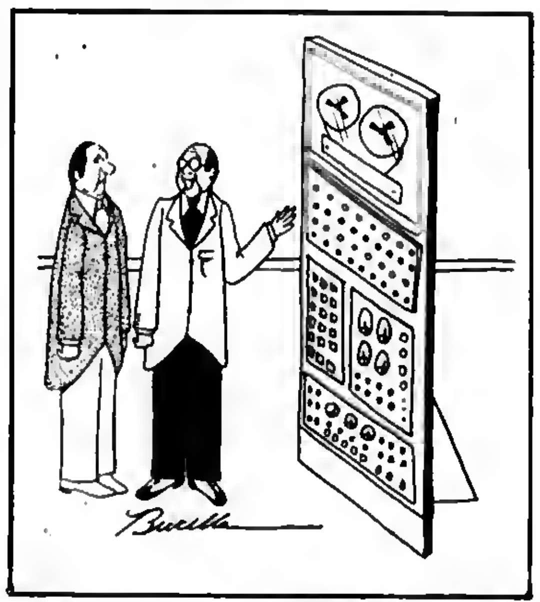

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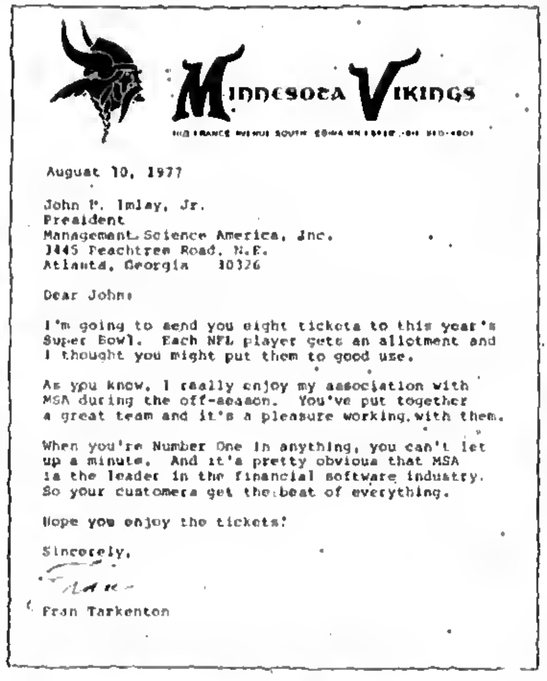

MINNESOTA VIKINGS

August 10, 1977

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President
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3445 Peachtree Road, N.E.
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Sincerely,

Fran

Fran Tarkenton

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Nov. 7	Washington	at Baltimore
Nov. 14	St. Louis	at Dallas
Nov. 21	Green Bay	at Washington
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Dec. 12	Dallas	at San Francisco
Dec. 17	Minnesota	at Detroit

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The team scoring the most points in any one of these games will be ________ (Team).

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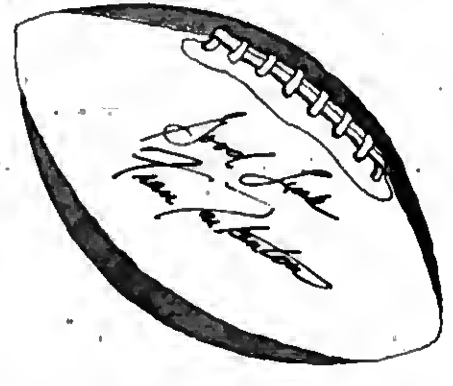
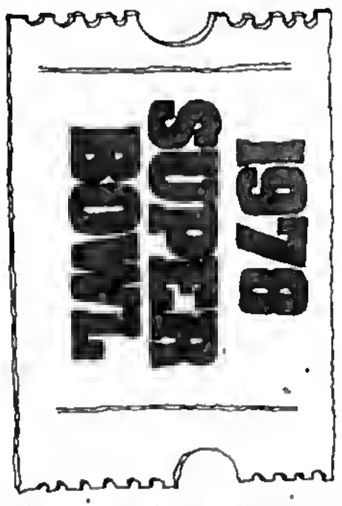


Entries must be postmarked no later than Sept. 30. Facsimiles of the entry blank are acceptable, however, only one entry per person. An independent judging firm will announce the winners in late December.



So get busy, sports fans. Make your selections and send them in. Someone will win these glorious, fun-filled Super Bowl trips to New Orleans next January, and it could be you!

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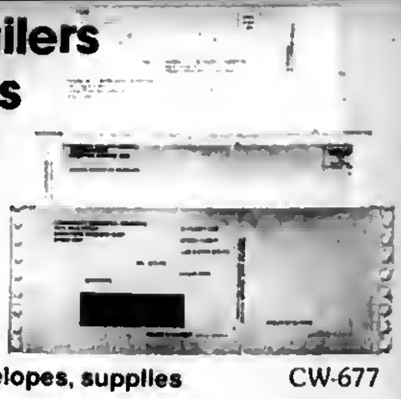

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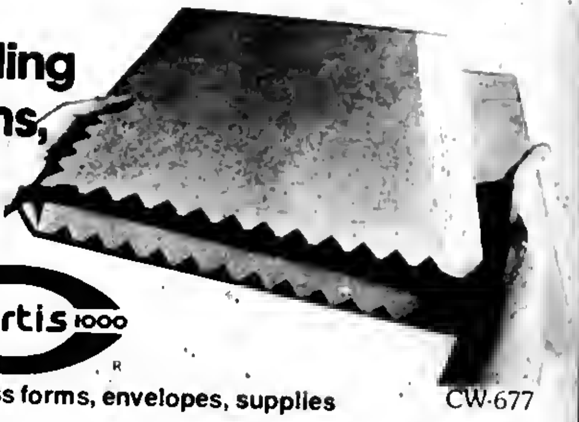

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Reader Commentary

'Ultimate' Method an Illusion

Users Facing Better Structured Designs

By Kenneth T. Orr
Special to CW

In his recent article [CW, June 6], Gopal Kapur certainly hit upon a significant topic — the confusion over structured technology. I find many people share Kapur's confusion. Since it first became a buzzword a few years ago, the use of the word "structured" in conjunction with programming has taken on a variety of meanings, many of them quite different from one context to another.

A few years ago, there was a basic agreement about what structured programming was. It meant, more or less: "GOTO"-less programming, hierarchical design and top-down development.

Indeed, there was a great deal of agreement and very little practical experience. At that time, very few people had used any or all of these tools to design reasonably sized programs — much less to design systems.

In the last four or five years, we have learned nearly as much about systematic systems development as we have in the last 10 or 12. Surprisingly, from the tone of Kapur's article, you might infer there is not much of substance behind all this literature.

But this is not the case. Indeed, the very fact that there is so much being written today about structured programming and structured systems design indicates something very important is going on.

While I think Kapur's conference is probably a good idea, I seriously doubt that such a conference is likely to produce the agreement on the subject he would like to see. Indeed, I have participated in a number of such meetings, including a Guide meeting in Chicago in November 1976 and a structured systems conference in Paris recently. And in all of the various structured conferences I have attended, I find participants who are enthusiastic about the effects of structuring on systems and programming, while at the same time having their own ideas as to the exact meaning of "structuring."

No, Kapur is apt to continue to feel frustrated. Indeed, since he teaches structured programming, he has his work cut out just keeping up with structured programming technology, not to mention keeping up with structured systems design and structured data base design.

I noticed that Kapur didn't mention Jackson, Yourdon, SADT, or Langston-Kitch structured methodologies. That just shows you how quickly things develop in a new area.

Mixed Group Best

From experience, I would suggest that the best way to learn about structured technology is not by gathering a group of skeptical managers together to discuss whether structured programming is what they are already doing. In most cases, we have found it is far more productive to get together a mixed group of people that includes people who have been using the technology for a copule of years, along with some others who are interested in finding out what is currently going on.

My firm has hosted two users' conferences on structured systems design in the last two years, and I feel the experiences discussed at those conferences would convince even the most skeptical manager.

The structure experience is now worldwide. I recently visited an organization near Paris (Societe Placoplatre) which has been involved in structured programming with Warnier and his group since 1969 and is now into structured data base and structured systems operations as well.

It is my guess that, unfortunately for Kapur, there will be more — rather than fewer — structured methods coming out in the next few years. My guess is that it will only be after some extensive shakedown period that these methods will begin to converge into a common technology.

But waiting for the ultimate is folly — it simply won't happen. In fact, organizations that choose any of the structured methods are apt to be better off than they are right now, simply because of the advantages resulting from the discipline required to structure a system. And those who move directly into applying structuring at the systems level will be in an increasingly good position.

In the last few years, we have seen a number of different camps emerge, all flying the "structured" flag. As a result, many managers

(Continued on Page 30)

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld*.

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- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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J.R. Pompa
Vice President & General Manager, SMISD

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THE SEARCH IS ON

Honeywell

Reader Commentary

'Software,' 'Program' Not the Same

'Program Writing' Fits Copyright Class Only

By Martin A. Goetz
Special to CW

A feel compelled to respond to the July 11 editorial about the National Commission on New Technological Uses of Copyrighted Works (Contu) and John Hersey's dissenting opinion.

As a long-time advocate of "software protection," I believe that some of the existing controversy is a result of the imprecise use of the terms "software" and "programs." While those terms have often been usad synonymously, I do not think they are interchangeable. A program can be in hardware (hard-wired) or in firmware (read-only or programmable read-only memory) and may not he at all soft.

Applied Data Research, Inc. (ADR), like IBM and many other companies, develops program products and has used the copyright system to protect its program "writings" for more than 10 years. The Copyright Office has been ragistering programs since the early 1960s.

Interestingly enough, Contu was not originally established to detarmine if programs were copyrightable, but to determine the status of conventional works of authorship when these writings are created, stored and processed by a computer. Contu's Oct. 8, 1976 preliminary report states on page 14:

"One of the first significant questions facing the commission was whether the protection, possibly through copyright of proprietary rights in computer software, should be within the scope of its mandate."

I learned earlier this year that Contu was leaning toward recommending the copyrighting of programs — not because copyrighting is the most reasonable, logical protection method, but because it was preferred over patenting.

I have been quite concerned with Contu's reasoning because the copyrighting of programs does not conflict with the "patentability of software" and therefore should not be a subject of contention.

ADR has spoken before the commission and is actively following the Contu hearings via the published transcripts. We support the commission's majority report and do not agree with John Hersey that a new registration system is desirable because tha existing copyright laws are applicable and adequate.

We do urge the DP community to note Hersey's description of a program, which really hits the nail on the head when considering the "software patentability" question. He says that programs, when axecuted by a computer, are a mechanical (or electronic) device.

ADR has argued that point for many years. The patentability question focuses on whether programs, when put in a computer, are devicas and part of a machine.

In fact, in the previous Supreme Court reviews regarding software patentability, the central question was: "Is a mochine process that is patentable if implemented in hardware (a circuit) equally patentable if implemented in software (a program)?"

I believe this question will again be the issue before the Supreme Court. The patentability of the "machine process implemented in software" is open to widely differing opinions and John Hersey's viewpoint may help influence the Supreme Court to rule that software can contain patentable subject matter and is part of a machine. But, in my opinion, a "program writing" is clearly only copyrightable.

Goetz, senior vice-president ot Applied Doto Reseorch, Inc. in Princeton, N.J., is choirmon of the Association of Dato Processing Service Organizotions' Softwore Protection Committee.

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Structured Design Better

(Continued from Poge 27)

see structured anything as just another set of programming tricks. A small number, though, have seen "structuring" for what it is — a technological revolution. These have heen the people who have taken over the structured theory and have made it work on real problems.

Constantine, Myers and Yourdon have done an excellent job of studying and documenting the characteristics of good and bad programs. But it is even more important to be able to have a methodology that tells you how to develop a good program from the outset so that you know it is correct when you are done.

That is what the Warnier, Jackson and Langston-Kitch approaches do. Jackson's methodology does it fairly well at the program level, and the Warnier and Langston-Kitch approaches do it at all levels: systems analysis, systems design, data base design and program design.

Software's Turn

For two or three decades now, tho hardware folks have been learning to deal with management in the midst of constant technological change. Changes in software have heen somewhat less dramatic, but also less productive. Now that breakthroughs have been made in the logical design of programs, data bases and systems, software management is going to be dealing with the same management problems the hardware management people have had to face on an ongoing basis.

The systems we build in five or 10 years will bear little relationship in terms of accuracy, cost, time or reliability to the ones we are building today. We are already well into our third generation of structured systems tools and techniques, and the effects are beginning to snowball.

The principal problem for today's data processing management is not just one of catching up, but one of planning to keep up as we learn more and more about doing things more productively. What was being taught in 1972 as the state-of-tha-art is already out of date.

We must be prepared to deal with the future, not the past.

Kenneth T. Orr is vice-president, Advonced Systems ot Longston, Kitch & Associotes, Inc. in Topeko, Kon.

Are Promising Programmers Slipping By?

Reader Commentary

By Jack M. Wolfe
Special to CW

In their selection procedures for programmers or programming trainees, some personnel directors administer a programming aptitude test that is, in effect, a speed test. Such a test is likely to be biased in favor of the college graduate, who is generally test-wise; he knows how to take a multiple-choice type of test that usually cannot be completed within the time limit allowed.

A company using such a test in the selection screening is likely to lose the careful, deliberate worker who rereads specifications for precision of interpretation and desk-checks carefully for accuracy in execution. Such a worker will seldom complete a test in which speed is a significant factor.

But such a worker may possess just the right attributes and good work habits for successful work in programming. Such a worker, moreover, will prove to be the one who is actually faster on the job because he will have less debugging and testing to do in bringing his jobs to successful completion.

A study of the relation between speed and score was made using the "Aptitude Assessment Battery: Programming," a test I developed which is generous in its allowance of time. Although the average time required for the completion of the test is about three hours, the time limit has been set at five and a half hours, which has been found to accommodate 99% of the persons who have taken the test.

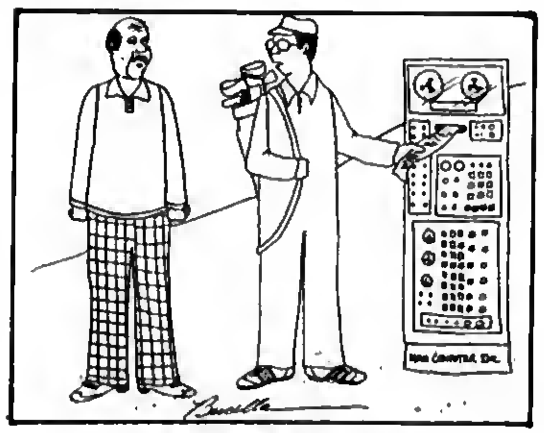
The test itself has been validated for on-the-job performance in programming by an agency of the U.S. government.

In a study of the results of more than 700 programmers and programming trainees with regard to speed and score, the group tested was distributed as follows:

	Slower 50%	Faster 50%
Higher scoring 50%	22%	28%
Lower scoring 50%	28%	22%

Thus the relationship between speed and aptitude for work in programming, as measured by this test, is not a very strong one. The coefficient of correlation represented by this table is only .12, which shows a positive correlation but not a strong one.

The speed factor in a screening test will cause the rejection of many capable persons. Consequently, a company will be meeting its needs for programming personnel by employing some persons who earned their higher scores by working with greater speed, rather than with greater precision.



'it Says: Use a Nine Iron!'

Even when the group studied was the superior group consisting of the highest scoring 25% of the programmers and trainees tested, the wide dispersion in speed was again observed:

Fastest 25%	34% of Superior Group
Next 25%	25% of Superior Group
Next 25%	20% of Superior Group
Slowest 25%	21% of Superior Group

Thus a substantial portion of this superior group, about 40%, would very likely have been eliminated from further consideration if the personnel department used a screening test in which speed was an essential factor.

A personnel director may feel satisfied that his use of such a test is appropriate because the screening test scores have been found to correlate satisfactorily with the grades assigned by the company's instructors in its training classes. But grades in training classes do not constitute the proper criterion for validating a screening test. Tests in training classes are also strictly limited in time.

It is sometimes claimed that the problems on a screening test are arranged in ascending order of difficulty and that the persons who did not finish the test would very likely have been unable to do the remaining problems even if they had more time. This claim is obviously untrue for the slow worker who did well on the problems that he did reach on the test.

And every researcher in testing is surely aware that there are numerous occurrences where a person makes errors on "easier" problems and then correctly completes other problems that are rated as more difficult.

As a practical matter, however, it is essential that some time limit be established in aptitude testing. Otherwise there will be some applicants who will just sit all day and go over their work virtually endlessly.

In establishing a time limit on its screening test it would be reasonable for a company to set such a limit at the point that will enable 90% of its applicants to complete the test. The test scores can then be used to rank the applicants, rather than for the assignment of percentile ratings as established in the tahle of norms issued by the publisher of the test.

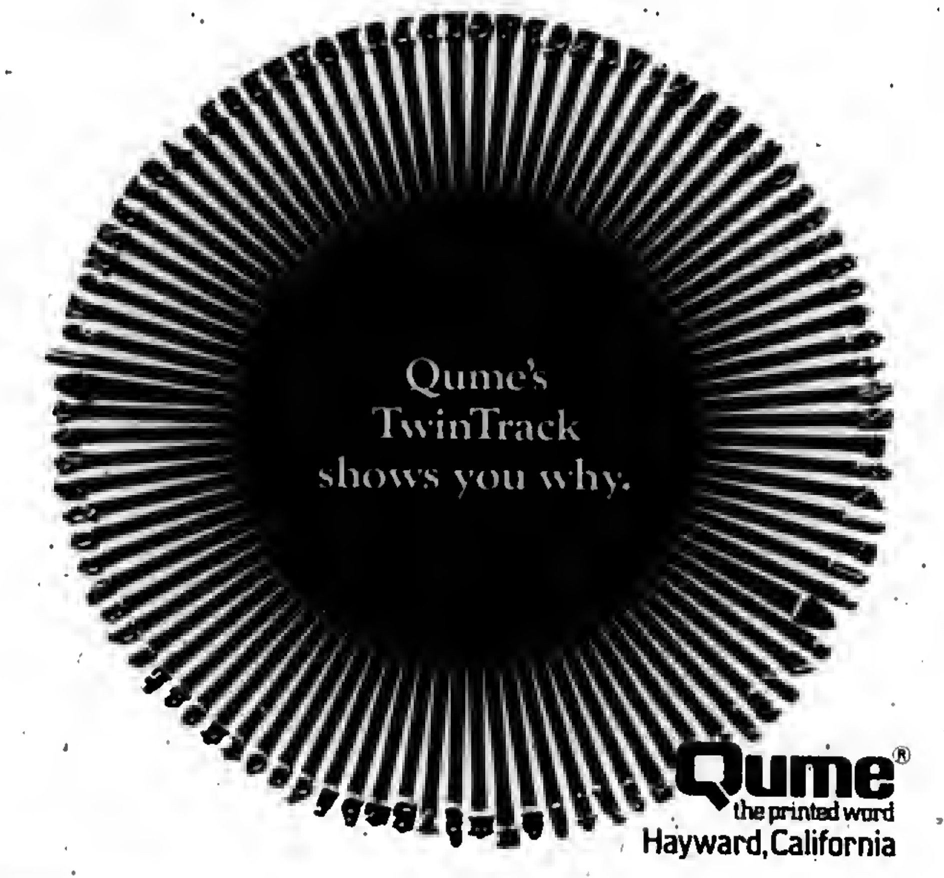
Even the presentation of the work in training classes adheres to a rather well filled course outline. Thus the training class ratings favor the faster workers and are likely to underestimate the more capable but slower workers.

In on-the-joh programming, a person works at what is basically his normal pace. In his actual work in programming, his seeming slowness because of his careful desk-checking of his work as he goes along will pay off in effectively making him a fast programmer in bringing his jobs to a successful conclusion.

But such superiority is not as likely to show up in his training class as his subsequent work on the job in programming.

A company can ill afford to let highly capable talent slip through its fingers unrecognized. Nor is it fair to the applicant who may thereby be discouraged from applying to any other company and may remain at an occupational level lower than that for which he actually posses potential.

Wolfe, o member of the boord of directors of the Associotion for Computing Mochinery's Speciol Interest Group on Computer Personnel Reseorch, is president of Progromming Speciolists, Inc. in Brooklyn, N.Y.



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Letters to the Editor

DP Business Should Have Professional Standards

Dear Joe Rigo,

I found your comments very interesting [CW, Aug. 29]. I, like yourself, am growing old. Although not 44 yet, I have been in DP now for 12 years. I started out on tab equipment and watched it grow, and I agree with your idea of nothing replaces experience. I have yet to see a person come directly out of school and sit down and write an efficient and dependable set of code.

In my years of working with DP and in business I have repeatedly noticed several discrepancies. I have seen people who are the opposite of Carmine Vona — people who, because of their bad DP habits, have virtually destroyed companies. These companies and the people who run them do need protection from the pseudo-data-processors.

This, in my estimation, is what the Certificate in Data Processing (CDP) is all about. It isn't for our generation; but we, with our varied experience, can and must make it work for succeeding generations. At the present, we are like the accountants were before CPAs. No ethical control. No social responsibility. No commitment. We cannot tell whether a beginning programmer or computer operator will be able to do the job.

Now don't get me wrong. I'm not saying the CDP and the Certificate in Computer Programming (CCP) will resolve everyone's problems. As always, we will have bad computer operators and accounting clerks; bad programmers and bookkeepers; bad systems analysts and comptrollers/CPAs. But we will have a set of standards, and non-DP people will have someone to turn to. If we then do not police our own, we will have socialized data processing. Not a threat, but a possibility.

So, Joe, you and I can either get our CDPs or we can continue much as we do today. It really doesn't matter to us. But, I also agree with Gary Casper; we need to professionalize our business, before someone does it for us, for the public good.

Walter A. Blankinship Sr.
San Antonio, Texas

Certificates Not Useless

The Reader Commentary section of the Aug. 29 issue was very interesting reading. Joe Rigo reminds us of the fact that the Certicate in Data Processing and/or the Certificate in Computer Programming (CCP) do not necessarily qualify a person as a computer professional. I agree!

However, Rigo failed to mention that professional people like Carmine Vona are not the average, run-of-the-mill data processors. The qualifications of any good systems analyst should, by definition, make everyone around him look good. While technical expertise is very necessary in implementation of computer systems, it is not, in my opinion, the critical factor that divides the average analyst from the outstanding person.

A good analyst is dedicated, realistic, well organized, highly motivated, accepts constructive criticism and insists upon user participation and management review and support. The good analyst sees the computer as another tool made available by company management for the solution of the problem.

Too many systems people see the computer as the end rather than as a means to the end. Very often, sophisticated computer systems are designed to satisfy the ego of the systems person instead of providing the user with meaningful information that is cost-effective and useful.

The good analyst believes training is an essential part of system implementation. He is not afraid of developing the capabilities of other team members assigned to the project.

The good analyst utilizes proven project management techniques to ensure projects are implemented on time and within budget.

Unfortunately, for every successful systems analyst I have seen, I can point to dozens of unsuccessful, unqualified people who have blazed their way up the ladder of success at the expense of their fellow workers.

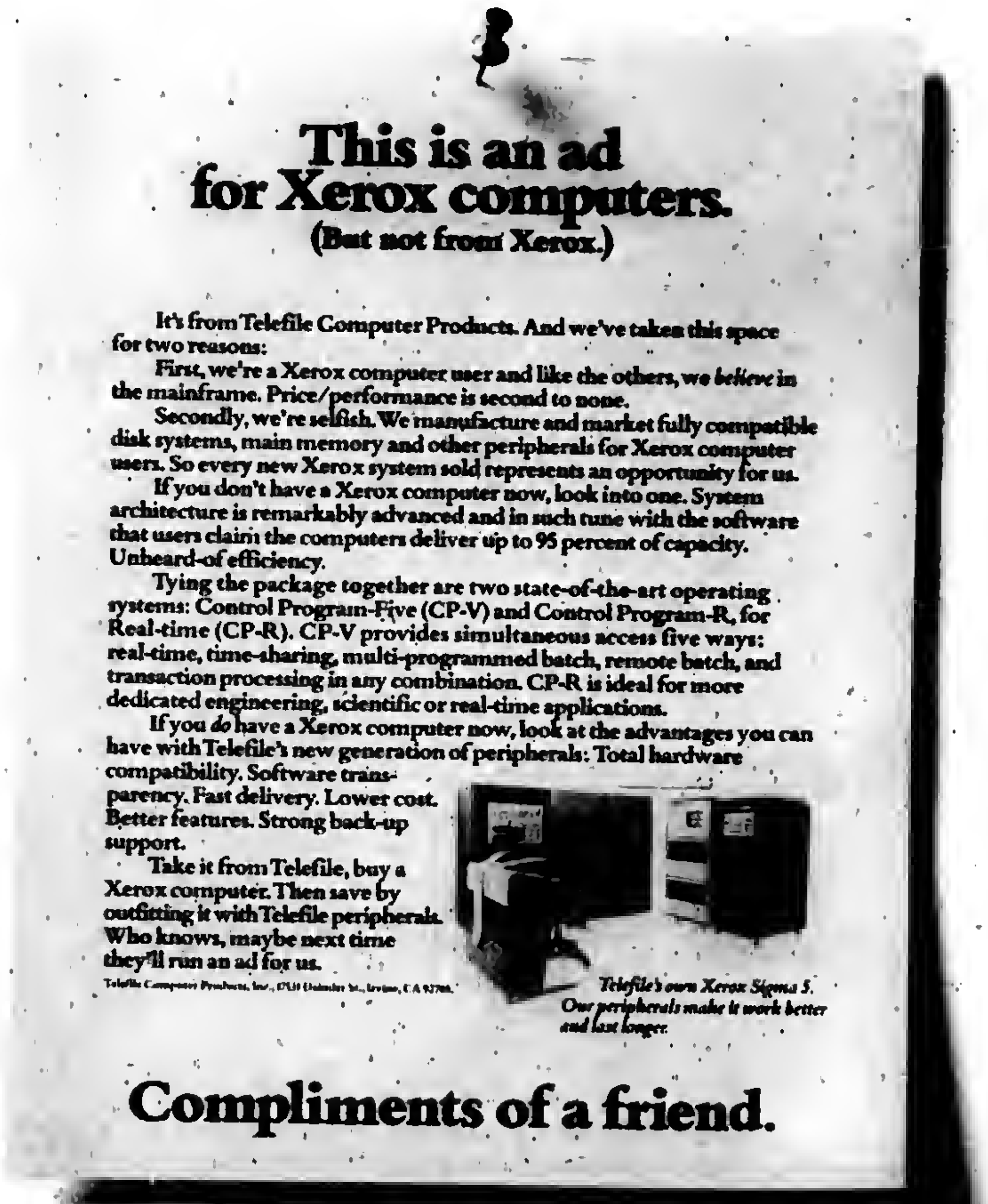
Obviously, the CDP and CCP, like the formal BA, BS, MBA, etc. do not by themselves replace the invaluable experience gained through years of active participation in the "school of hard knocks." The use of CDP after your name should be as important to the DP professional as the MD is to the doctor.

Perhaps the CDP is not as important today as many people would like it to be. However, to take the attitude that the CDP, the CCP and a code of ethics are useless ensures that our profession will continue to be cluttered with unqualified egotists ready to force their sophisticated garbage on an unsuspecting user community.

While Prof. Casper's comments obviously cannot be taken as gospel for the DP community in general, they can be applied to evaluating a significant percentage of its members.

Perhaps the problem can be eliminated. However, without the involvement and leadership of the qualified professional, this is an impossible task.

Richard M. Dawson
Oberlin, Ohio



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And now to give Xerox users room to grow, Telefile is embarking on the development of *two new micro-programmed Sigma mainframes* for introduction in 1978. One will run four times faster than Xerox' biggest machine, yet cost only about half as much.

That's computer enhancement. To Xerox users it means a way to take their computer investment and superior software into the 1980's in style.

Univac users, you're next.

Telefile
Enhancing computers is our business.

Letters to the Editor

More Than Certification

Many articles have been printed by *Computerworld* and others on the subjects of licensing and certification. The article by Jim Brown in the Aug. 1 issue informatively and nonemotionally addressed the question of whether the Certificate in Computer Programming (CCP) will repace the Certificate in Data Processing (CDP).

Several points that are really tangent to the main argument are regularly raised by opponents of licensing.

First, if, as Brown stated, "The ICCP [Institute for Certification of Computer Professionals] said that '. . . at the present time there are no generally accepted definitions of job functions . . . or agreement upon knowledge and skills to practice in these jobs . . . ,' " then how is it possible for certification to provide a uniform measure of knowledge and performance potential?

It would seem that some definition has to exist if it can be tested. Therefore, some definition exists which can be licensed.

Second, much uproar continues to obscure the reason for licensing DP professionals. The uproar belongs, and rightly so, to those individuals who do not wish to practice public DP.

Doctors, lawyers and accountants who do not practice their professions on patients or clients are free to apply their skills and knowledge as they wish without licensing or certification. The same should apply to data processors. Only those individuals should be licensed who desire to offer their services to the public on a professional-client basis.

Certification can be of significant value in a licensing program. Licensing, however, can go further; to define job functions; to establish knowledge and skills required to practice; to provide for continuing education in order to assure high quality of service; and to enforce, not merely promulgate, standards of conduct and performance.

Self-assessment and peer group evaluation can be imortant. To those of us who worked for our certificates, it was important.

I believe certification and licensing cannot be mutually exlusive. The two programs should serve those who desire to be served. For those individuals who choose neither certification nor licensing, I wish you success.

Thomas C. Alewine
Columbia, S.C.

Need Clearer Explanation

Jim Brown's article puts some of the previous articles on certification into realistic perspective [CW, Aug. 1]. However, it raisos an important point that I feel needs clarification.

Brown stated that "certification encourages continuing education." Could he or the Institute for Certification of Computer Professionals (ICCP) explain this? I think that having attained a Certificate in Computer Programming or Certificate in Data Processing an individual would tend not to continue his professional education.

My wife is a registered nurse and a condition of her license renewal is 30 hours of continuing education every two years. Is the ICCP talking about certification or licensing?

If they are involved with certification, not licensing, could someone explain the relationship, or requirement, between their program and continuing education?

James R. Shannahan
Santa Clara, Calif.

Architecture, Not Machines

In regard to the story "PDP-11 Leading Choice for Military Standard" [CW, Aug. 8], I would like to make two corrections. First, the figure given as $3 million a year for Department of Defense software expenditures should be $3 billion.

Second, the article makes reference to "the [Digital Equipment Corp.] machines," which may give the wrong impression about the Military Computer Family project. The proposed standardization would be on the PDP-11 architecture, not DEC machines.

If implemented, this standard would enable the services to procure militarized hardware from several suppliers, all building to the government-specified architecture (i.e., instruction set), while utilizing their own hardware technology. In effect, the government would obtain a license from DEC to utilize the PDP-11 architecture, and would be free to pass on that license to potential suppliers, solely for the purpose of building militarized (not commercial) hardware.

Lt. Col. Alan B. Salisbury
National Defense Univeristy
Washington, D.C.

Tip for Saving Energy

The examples of saving energy in the June 23 issue of CW require expansion and reverse logic ["CPU Heat Harnessed; Utility Saves Face" and "IBM Plans Buildings That Conserve Energy"].

We can conserve as much energy in summer as we are now planning to save in winter by designing CPUs, other office machines, home appliances, etc., with a hood and blower if they don't already have a blower as refrigerators do.

John W. Ecklin
Alexandria, Va.

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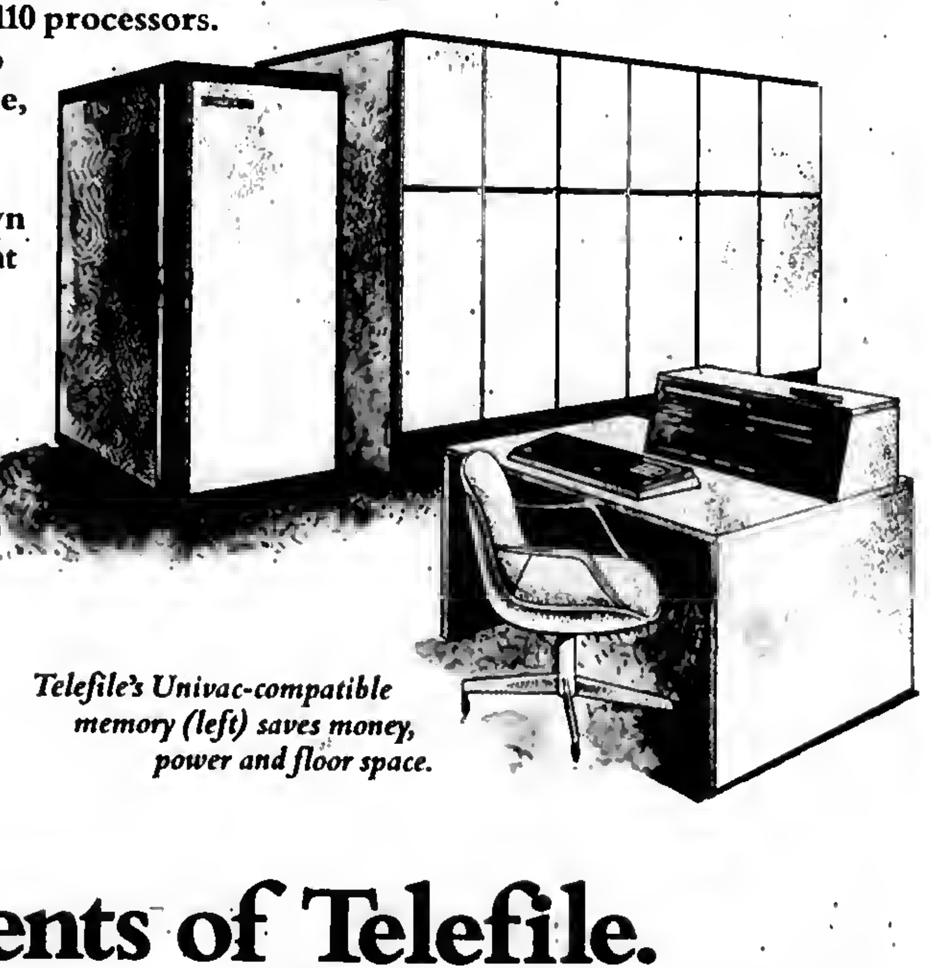

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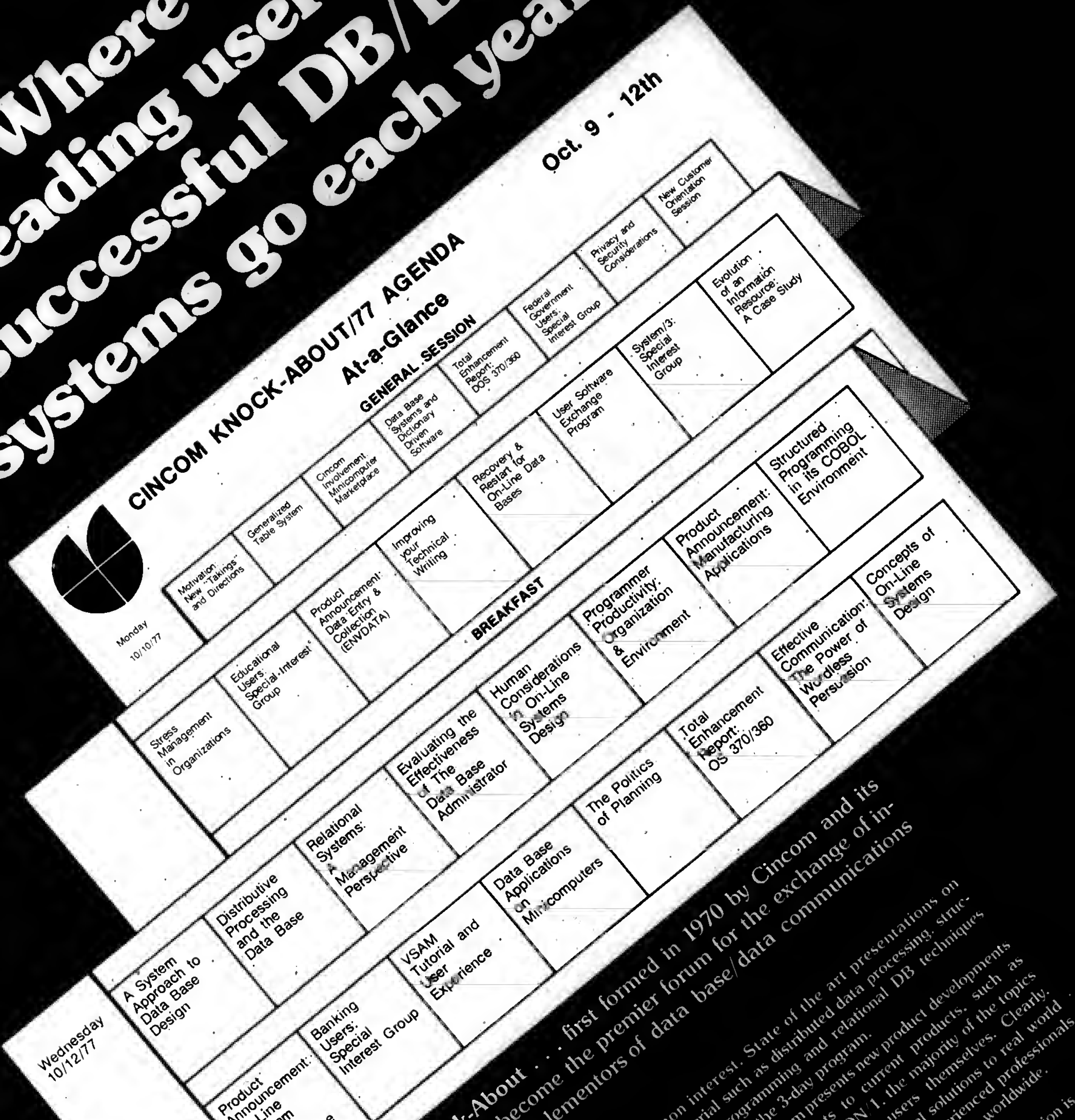

CINCOM KNOCK-ABOUT/77 AGENDA

At-a-Glance

Oct. 9 - 12th

Monday

10/10/77

GENERAL SESSION

- Motivation: New "Takings" and Directions
- Generalized Table System
- Cincom Involvement: Minicomputer Marketplace
- Data Base Systems and Dictionary Driven Software
- Total Enhancement Report: DOS 370/360
- Federal Government Users: Special Interest Group
- Privacy and Security Considerations
- New Customer Orientation Session
- Educational Users: Special-Interest Group
- Product Announcement: Data Entry & Collection (ENVDATA)
- Improving your Technical Writing
- Recovery & Restart for On-Line Data Bases
- User Software Exchange Program
- System/3: Special Interest Group
- Evolution of an Information Resource: A Case Study

BREAKFAST

- Stress Management in Organizations
- Evaluating the Effectiveness of The Data Base Administrator
- Human Considerations in On-Line Systems Design
- Programmer Productivity: Organization & Environment
- Product Announcement: Manufacturing Applications
- Structured Programming in its COBOL Environment
- Relational Systems: A Management Perspective
- The Politics of Planning
- Total Enhancement Report: OS 370/360
- Effective Communication: The Power of Wordless Persuasion
- Concepts of On-Line Systems Design

Wednesday

10/12/77

- A System Approach to Data Base Design
- Distributive Processing and the Data Base
- Data Base Applications on Minicomputers
- VSAM Tutorial and User Experience
- Banking Users: Special Interest Group
- Product Announcement: On-Line Program Library Maintenance System

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Over 600 Cincom customers will gather at Knock-About '77, October 9-12, to attend and participate in 75 sessions presented in 8 concurrent tracks. The breadth and depth of the agenda (sample above) will enable each person to tailor a meaningful program to his or her professional responsibility . . . manager, system designer, programmer, data base administrator, on-line specialist, etc.

Special interest groups have been scheduled to provide the opportunity for industry-oriented interaction and in-depth discussions of subjects of common interest. State of the art presentations on material such as distributed data processing, structured programming and relational DB techniques punctuate the 3-day program.

While Cincom presents new product developments and enhancements to current products, such as TOTAL and ENVIRON/1, the majority of the topics are conducted by the users themselves. Clearly, the emphasis is on practical solutions to real world problems, contributed by experienced professionals from our resource of installations worldwide.

If you are a Cincom customer, we hope to see you at Knock-About '77. If your organization is considering data base or data communication software, why not contact Cincom Systems immediately. We can help you prepare your organization's DB/DC success story in time for presentat at the next Knock-About (April, 1978).

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DPMA OKs CDP Special Interest Group

By Don Leavitt
CW Staff

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has granted provisional status to a special interest group for Certified Data Processors. Acting president of the group is Beverly Madron, an assistant professor of data processing at Western Kentucky University.

Madron would welcome the names of members of DPMA and others holding the CDP designation who would be willing to help her organize the new group and plan meetings. She said anyone could contact her at Grise Hall, at the university in Bowling Green, Ky. 42101.

"Our initial thrust will be an industrywide education effort to recognize the Certificate in Data Processing (CDP) as a viable and useful mechanism for the individual holder and others to measure the knowledge and competence in our always evolving field," Madron said in explaining why the group is being organized.

The group will be aiming for the type of acceptance toward the CDP that, for example, the CPA enjoys in the field of accountancy. Some companies now encourage employees to work for the CDP; more should and our group will be spending much time spreading the word," she added.

The special interest group will make an effort at coordinating its work "in some way" with that of the Institute for Certification of Computer Professionals (ICCP), the organization that now administers the CDP exam. Madron made no mention of the possibilities of working with the independently organized Society of Certified Data Processors (SCDP).

Exam Preparation

"We plan to become involved in CDP exam preparation courses and review materials," she added, noting there is currently no organized national effort to provide review classes or to review the more and more numerous teaching aids supposedly designed to prepare for the exams.

CCP Confusion

Madron noted also that there has been some confusion over the introduction this fall of a new examination program by ICCP, leading to a Certificate in Computer Programming (CCP) designation for those who pass it.

"For those who believe such additional levels of certification may dilute the prestige of the CDP, there are those who feel just as strongly that such stratification of the broadly inclusive label of data processor will improve the visibility of the CDP, which after all is directly aimed at managerial and similar senior level persons," Madron commented.

The DPMA special interest group also plans to tackle the issue of continuing education after certification. Preparing for the exam is a major educational effort with definite career path advantages. "However," Madron cautioned, "the longer the program is in existence and the more time that passes following certification, the more necessary becomes some form of continuing education. I'm sure the group will address this concern.

According to the association, there is a $10 annual membership fee for the new group, and as long as the group has provisional status within DPMA, members of the special interest group for Certified Data Processors need not be members of the association.

'HSM' Swaps Dasd, MSS File

WHITE PLAINS, N.Y. — An IBM program product, to be available early next year, is said to arrange data efficiently in a storage hierarchy including the IBM 3350 and 3330 direct access storage devices (Dasd) and the IBM 3850 mass storage system (MSS).

The Hierarchical Storage Manager (HSM) package keeps "active" data sets on the faster Dasd units, but moves more dormant ones to the lower cost-per-Mbyte MSS. It also makes backup copies of altered data sets, which can be retrieved on command, according to a spokesman.

The "migration" of data sets between the storage media can occur at a regular time each day or a predetermined time interval that can be more or less than 24 hours. The choice is up to the installation and can be changed with conditions, he added.

As HSM moves the less active data sets to MSS, it frees Dasd space for new applications. Since new projects are often on-line, this resource is generally in critically short supply. Since HSM "backs up" only altered data sets, however, it also saves some resources in that task which can be used for other operations, the spokesman continued.

By managing the "migration" chores without operator intervention — except to set the original parameters — the system also reduces or eliminates media handling and manual data management and backup procedures, he said.

HSM operates with OS/VS2 MVS Release 3.7 on IBM 370/145 and larger CPUs, including the 3033 processor. HSM is compatible with Release 2 of Version 1, Resource Access Control Facility (RACF) data security software and can operate with multiple hosts, he added.

HSM will be available in the first quarter of 1978 for a monthly charge of $350.

'Goes' Runs On-Line

SAN DIEGO, Calif. — The Gemini Order Entry System (Goes) was designed by Gemini Associates for firms with a high volume of customer orders who need to reduce time lags between receipt of orders, shipments of the desired products and subsequent payment of the invoice, a spokesman explained.

Written in Cobol, Goes currently uses Cincom's data base management system Total and teleprocessing monitor Environ-1, but it can easily be adapted to any equivalent systems, Gemini said.

Operating either on-line or in batch, Goes is said to feature customer verification and credit checking, as well as current receivables balances; automatic input to all affected departments; automatic generation of shippers and invoices; product location within stores; finished goods inventory, including product allocation and relief; and an interactive system of prompting correct data entry, a spokesman said.

Goes can be purchased for $20,000 or rented for $550/mo.

Gemini Associates can be reached through P.O. Box 81949, San Diego, Calif. 92138.

'Maps' in Basic-Plus 2

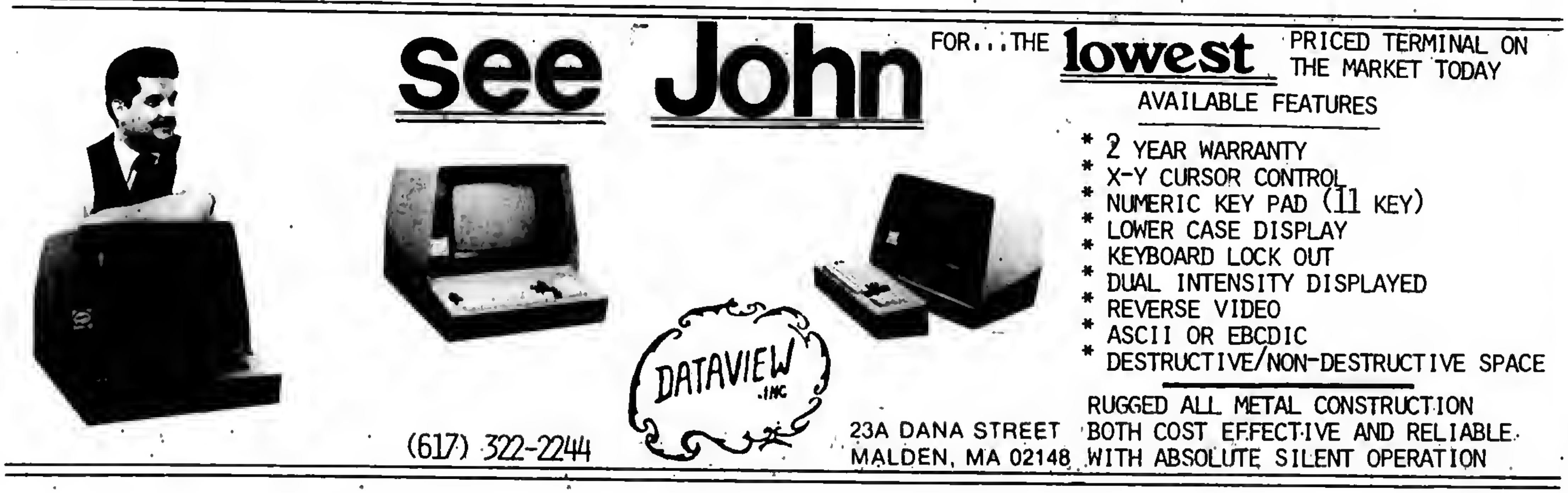
PALO ALTO, Calif. — Ross Systems, Inc. has released Version 2 of its Management Aid for Planning Strategies (Maps) software, a generalized financial modeling and reporting package. Maps operates on a Digital Equipment Corp. PDP-11, using RSTS/E and is available in both Basic-Plus and Basic-Plus 2.

Built around a user language intended for nontechnical people, Maps creates its output from matrix descriptions of the rows and columns desired.

In addition to formatting capabilities, Maps contains a file maintenance system, the ability to ask "what if" questions, and a capability of consolidating reports, the company said.

Maps is offered on a timesharing basis or can be licensed to operate in-house for a one-time license fee of $10,000.

Ross Systems is at Suite 208, 1900 Embarcadero, Palo Alto, Calif. 94303.



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On-Line Systems Keep Canadians Cars Moving

Special to CW

OAKVILLE, Ont. — An on-line system developed by the Ford Motor Co. of Canada, Ltd. is reportedly helping Ford and Mercury car and truck dealerships throughout this country to provide better customer service, reduce operating costs and maintain precise day-to-day control over the operation of their businesses.

The system, named Dealership Computer Services (DCS) is one of three major on-line systems developed at Ford. The others are Warranty Claims Processing and Accounts Payable. All have been designed and programmed using the facilities provided by Task/-Master, a teleprocessing monitor from Turnkey Systems, Inc. of Norwalk, Ct.

All of Ford's on-line applications operate in a single region of an IBM 370/168 under OS/SVS.

DCS itself consists of three major components: an order entry, inventory control and inquiry system for parts and accessories; a system for ordering new vehicles; and a complete dealership accounting system. Each component is a modular element of the total DCS package, allowing each dealer to selectively implement specific applications based on individual needs.

With DCS, each dealer has direct access to the centralized files of parts and vehicle data maintained by Ford.

Len Sanci, owner of Oak-Land Mercury Sales, Ltd. in Oakville, is very pleased with the success his dealership has had with the system. "It has streamlined our entire operation primarily because it's such a complete package. Through the same terminal we can order cars, order parts, track the status of parts and handle all of our accounting transactions."

One of the biggest advantages of the system, according to Sanci, is in the area of car maintenance and repair, where the availability of a single part can be critical. "In car repairing everything is an emergency. Under the old system, we had to phone in our order, and we didn't know until the delivery truck arrived that a part wasn't available. In the meantime we've tied up a mechanic, tied up a stall and disappointed a customer," he said.

"Now, all we have to do is walk over to the terminal, type the order in and we know immediately whether all the parts are available. If a part we need is out of stock at the distribution center, the system not only tells us where the nearest dealer is who has one in stock, it also lets us know when the next shipment will arrive from the manufacturing plant. That kind of information is invaluable in controlling our shop," he asserted.

Accounting Benefits

Jack Mason, secretary/treasurer of Oak-Land Mercury, reported additional DCS benefits from a financial control and accounting standpoint. "By entering all of our sales, accounts payable and accounts receivable transactions through the terminal, we can keep current on a day-to-day basis," Mason said.

Each transaction entered into the system is checked against the files maintained by Ford of Canada at its headquarters here "Errors are detected immediately and corrections can be made on the spot," Mason noted.

"Under our old accounting system we created a paper tape and had it sent out for processing. We didn't find out about any errors until two days later when the listing came back. In addition, because we're on-line with Ford, we have access to the latest pricing and part number data including 'replaced-by' information that just wasn't available under the old system," he said.

The ability to support "almost every type of terminal on the market" was just one of the reasons that Task/-Master was selected, according to George Ridout, a computer specialist responsible for technical support of Ford's on-line systems. "Probably the major reason we picked the package was because it was a full-feature monitor that would fit on our computer.

"In addition, because we are very performance-oriented, the ability to select only those functions of Task/-Master that we needed through customizing meant our system would operate with minimum overhead," he noted.

Although Ford has since removed some of its storage restrictions in going from an OS/MVT environment to SVS and a larger machine, it still considers Task/Master's basic efficiency a major advantage.

Having a monitor that is easy to work with is also important to Ford. It has allowed development work for new on-line systems to be done by analysts and programmers who were already familiar with the user department's needs, but not necessarily expert in on-line programming.

The on-line applications currently in operation at Ford of Canada are only the "tip of the iceberg" when compared with what the future might bring, according to Gordon Reade, manager of technical systems services. "Advances in technology have allowed us to evolve more and more into an organization that operates in 'real-time,' where as soon as a transaction enters the system at one point, an appropriate response is generated at another. We're not there yet," Reade said, "but the time between an action and a corresponding response is getting smaller and smaller all the time."

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Structured Maintenance — Part I

Approach Trains User to Read 'Alien' Code

By Edward Yourdon
Special to CW

Structured programming, structured design and structured analysis have revolutionized the development of new computer systems in the past few years. Numerous case studies and surveys have documented impressive gains in productivity, reliability and maintainability of these new systems.

But what about existing systems? It is estimated that at least 50% of all software activity in the U.S. is spent maintaining existing systems — and for many large organizations, the figure is closer to 75% to 80%. Most of these systems were developed long before anyone knew about modular programming, structured programming or any other "modern" development techniques — so it is no surprise that they continue, even after 10 years, to be unreliable and difficult to maintain.

So, what can be done to improve the state of affairs for these wretched old systems, with which we must live for another five to 10 years? Fortunately, there is a new discipline emerging, structured maintenance, which is aimed specifically at the technical problems encountered by maintenance programmers. Those problems are usually such things as:

- Nobody remembers specifically what the system is supposed to do, nor does anyone really know with any certainty what the system *does* do.
- It is often difficult to relate specific actions (or outputs) of an existing system to the specific "chunks" of code (we hesitate to use the word module) that produce those actions.
- If a programmer changes code in an existing system, it is almost impossible to know whether any other part of the system will be affected.
- It is extremely difficult, frustrating and unpleasant learning to read "alien" code developed by another programmer.

Components of Method

Structured maintenance includes: techniques to document the structure and interconnections of existing systems; guidelines for reading alien code; guidelines for modifying, retesting and debugging alien code; economic models for deciding when existing systems can profitably be rewritten; manual and mechanical techniques of "restructuring" all or part of an existing system; and the use of walkthroughs and teams to decrease the errors and boredom associated with maintenance.

Most of the documentation techniques have been used successfully for the development of *new* systems; what is interesting is that they are now being used to document existing systems. These techniques include Heirarchy plus Input-Processing-Output (Hipo) and structure charts, data flow diagrams and — in the rare cases where complex, decision-oriented logic has to be deciphered — decision tables.

These techniques have been successful in recent maintenance efforts because the existing documentation is usually obsolete; the existing documentation and/or the existing code presents a "low-level" view of the system, without providing the overview that the maintenance programmer needs so desperately; and the existing documentation almost never warns the maintenance programmer of the subtle interconnections between one "chunk" of the program and another.

Reading Techniques

Structured maintenance also concentrates on techniques for reading alien code — almost as if it were an exercise in archaeology. It is ironic that we train most programmers in "write-only" mode — that is, we train them to *write* computer programs without ever teaching them the nontrivial art of *reading* computer programs. Imagine what things would be like if we taught English, French and Spanish that way!

What does a programmer have to learn to be able to read programs successfully? Perhaps the most important thing to learn is the importance of taking notes. Reading a program usually raises questions that can't be answered immediately or it suggests modifications that the programmer would like to make "some day.".

In our work, we recommend that the maintenance programmer keep five "diaries": bugs, maintainability issues, usability issues, efficiency issues and mysteries and unanswered questions.

Yourdon is chairman of the board of Yourdon, Inc., New York, and author/coauthor of several books on "structured" DP techniques.

'007' Packages Code Data

WILBRAHAM, Mass.— Hansco Data Processing, Inc.'s 007, a user key-controlled encryption/decryption routine, can be invoked by standard calls from application programs on IBM 360/370 CPUs, according to a spokesman.

The routine comes in two versions, Civilian/007 and Federal/007. Both are based on mathematical manipulations ordered by user-supplied 8-byte activating keys, allowing up to 1.7 quintillion possible ciphers, Hansco claimed.

Civilian/007 protects data through a unique two-stage algorithm; Federal/007 is a software implementation of the Data Encryption Standard now required by the federal government for sensitive and valuable data, the vendor explained.

Requiring only 2.5K bytes of main memory, the routine is self-relocating and reentrant and can' be used in almost any IBM 360/370 environment. Either version is available in object form for $495; BAL source decks can be provided at additional cost.

Hansco can be reached through P.O. Box 236, Wilbraham, Mass. 01095.

Mini Quarterly Now Two Books

NATICK, Mass. — The *Minicomputer Software Quarterly*, published by International Management Services, Inc. and available for $85/yr., has grown 60% since it was first released a year ago. It is now in two loose-leaf volumes.

The quarterly will continue to be indexed by application area and cross-referenced by minicomputer and by source language, a spokesman said. The book now carries over 500 program descriptions, each covering the product's technical points, the vendor's support, cost of the program and name and location of the vendor.

The publisher is at 215 Oak St., Natick, Mass. 01760.

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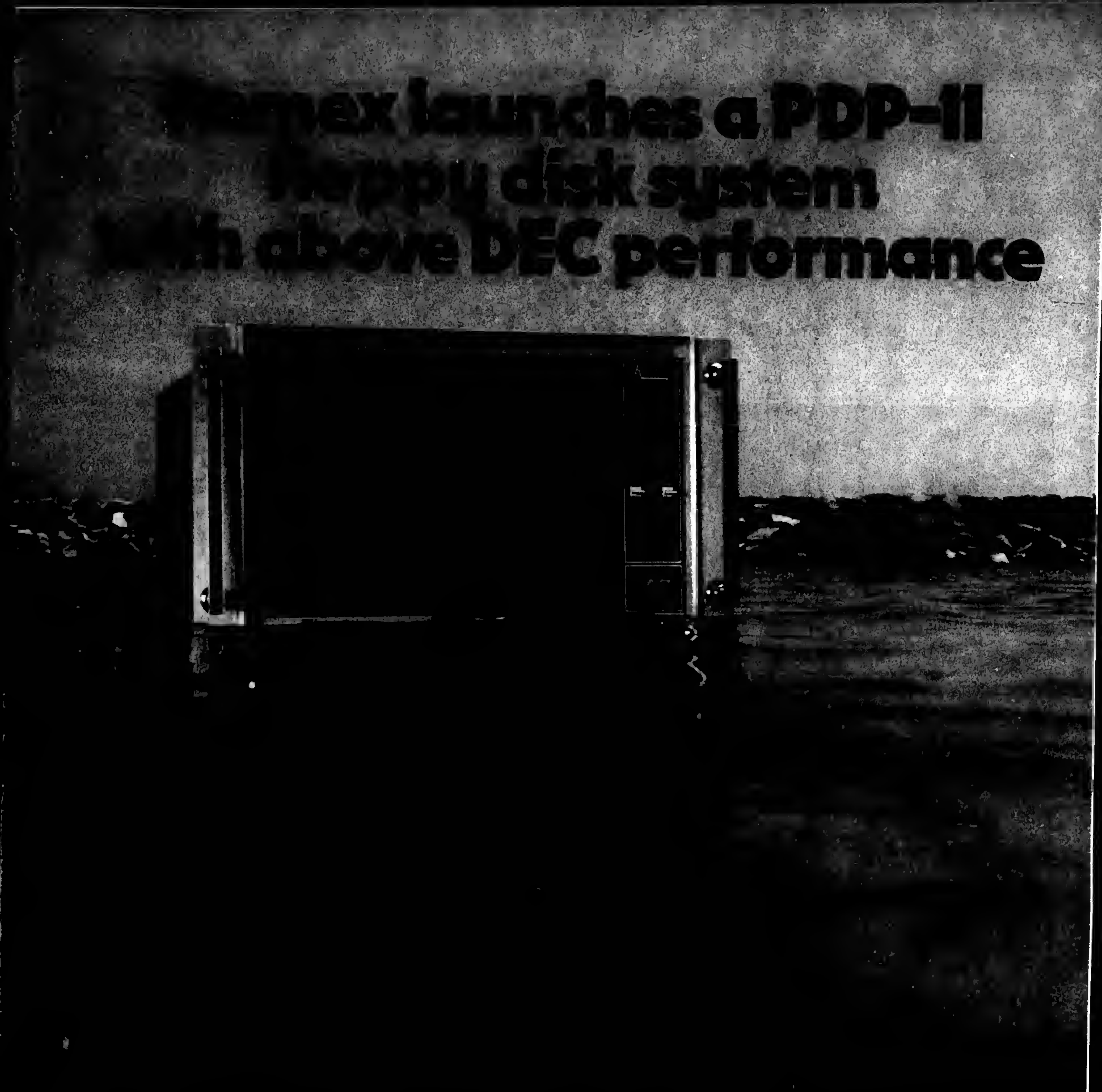
Remex launches a PDP-11 floppy disk system with above DEC performance



It's an integrated hardware/software system so compatible with DEC's RT-11 operating system that we named it Remex-11.

It connects directly to the PDP-11 or LSI-11 bus, offers about 25 percent greater storage capacity than Digital's RX11 disk system, and it costs less.

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'Centre-US' Data Base Positions 110,000 Places

ELMHURST, Ill. — The latest edition of Centre-US, a magnetic tape-oriented data base of geography for the U.S., contains coordinates and geocodes for 110,000 places in this country, according to Centre Mark Co., the vendor.

Each of the 126-character records contains fully spelled place name, latitude/longitude coordinates and, if assigned, postal Zip Code, Standard Point Location Code (SPLC) and the Dun & Bradstreet state-county-city geocode.

The county records also include square-mile area, bounding rectangle coordinates and Federal Information Processing Standards (Fips) and IBM state-county numeric codes, a spokesman noted.

The file provides geographic logic for many distribution, vehicle control, marketing and automatic mapping programs for a wide spectrum of users. It is updated semiannually so that information such as Zip Codes is reasonably current, he added.

Centre-US can be furnished in most standard tape formats.

The initial tape and the first semiannual update cost $5,000. The subscription service to keep the file up to date after the first year costs $500 annually, Centre Mark Co. noted from 296 Elm Ave., Elmhurst, Ill. 60126.

RCC Net Adds Trades Analysis

PALO ALTO, Calif. — The Trades Analysis feature of the Liquidity Management System (LMS) on the Remote Computing Corp. time-sharing network provides a way of comparing investments in a portfolio with investment opportunities currently on the market, a spokesman said.

In supporting institutional portfolio managers in their trade or purchase decisions, the feature uses a large data base of market prices to determine yields from the purchase of specific investments, including short-term instruments, bonds, GNMA passthroughs and Agency and Treasury issues, he added.

To obtain an analysis, the user specifies the type of instrument desired, the minimum acceptable profit on a trade, the maturity range of purchased investments and their price ranges. The analyses can cover trades between securities of the same type or between securities of different types, the spokesman continued.

Users can refine the definitions of what they want by adding a reinvestment rate for interest income, ineligible security types, pickup-giveup spreads and similar constraints, he said.

The results of the system's analysis are reported as the five "best trades" for any investment now in the portfolio or the five "best buys" with a given instrument type.

Remote Computing has regional offices in the New York City area and in Los Angeles. It is headquartered at 1076 East Meadow Circle, Palo Alto, Calif. 94303.

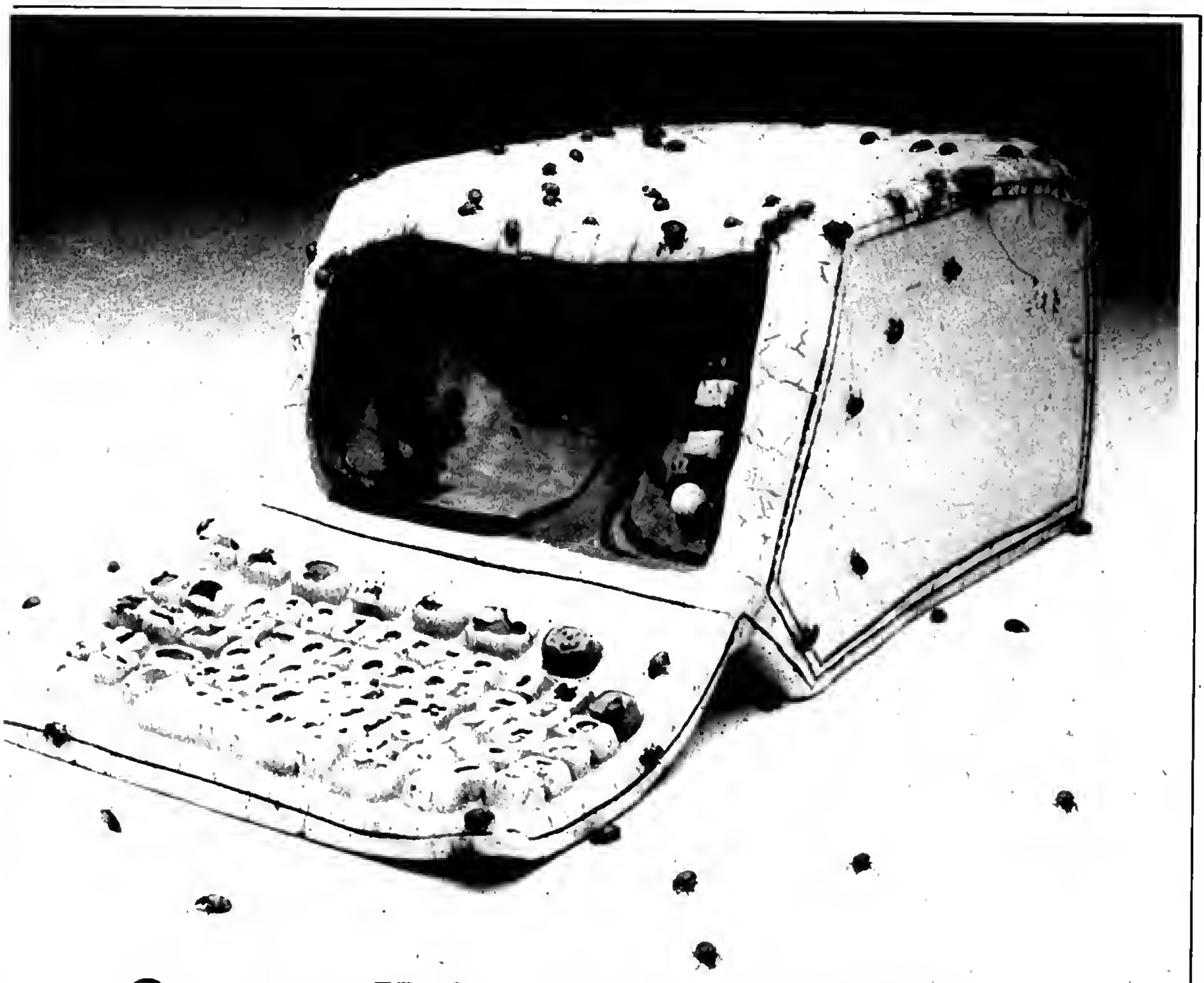
McAuto Service Runs MDs' Bills

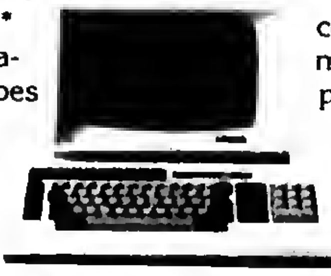
ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has extended the facilities available under its Hospital Services network to include Physician Data Services (PDS), an interactive financial system to handle accounts receivable and collections for medical groups and clinics.

PDS should help improve cash flows for these users, McAuto said from its headquarters here in St. Louis, Mo. 63166.

SEMINARS

Seminars on Production Planning Inventory Control Systems will be given by Management Technology Incorporated in Cincinnati, Ohio on Thursday, September 29 and in Grand Rapids, Michigan on Thursday October 6. Reservations are necessary. There is no charge to attend. For information contact Jerry Carter at (616) 531-5397 or write M.T.I., P.O. Box 8471, Kentwood, Michigan 49508.





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Fortran Code Optimized For Vector, Array Processors

MARINA DEL REY, Calif. — The Vectorizer package from R&D Associates accepts standard Fortran programs and analyzes them to discover statements or sets of statements which can be rewritten to take advantage of vector or parallel architectures, according to a spokesman.

Developed by Massachusetts Computer Associates, the package appears to be useful in connection with either the 7600 or the Star systems from Control Data Corp., the Cray-1 from Cray Research, Inc. or the ASC from Texas Instruments.

The Vectorizer's analysis phase is "extremely machine-independent:' it looks for vectorization possibilities without regard for the architecture of the underlying machine," the spokesman said.

During code generation, however, the software "relies heavily" on the target machine's characteristics to produce optimized vector or array sequences, he noted.

Analyst Helps

Although the software produces improved code with no help from an analyst, it also produces diagnostics that enable an analyst to go further, making greater use of the vector or array processing capabilities of the target machine, he added.

In one benchmark that used a finite difference routine which made repeated passes over a large array, the same Fortran source code ran 2.1 times faster on the CDC 7600 and four times faster on the Cray-1 after vectorization than before, he claimed.

For the CDC 7600, the Vectorizer costs $95,000; for Cray-1, the cost is $105,000. Monthly rental agreements are also available from R&D Associates, which can be reached through P.O. Box 9695, Marina del Rey, Calif. 90291.

Package Eases PCB Graphics

BERKELEY, Calif. — PC50 from Second Source Industries is described as an interactive software package designed to run on the Tektronix 4051 graphics system to produce accurate, camera-ready layout art and documentation for printed circuit boards (PCB).

High-density double-sided or multilayer layouts, up to 30- by 40 in., are generated up to 10 times faster than is possible with common manual methods, a spokesman claimed.

Ground planes; solder mask and silk screen art; and drilling, fabrication and assembly drawings are also produced, he said.

The software works from a data base of PCB elements which can be customized to fit the designers' needs. These elements can be called, oriented, positioned with the system's joystick and displayed on the CRT.

Data is stored and later output to a Tektronix 4662 plotter at any user-specified scale. Editing facilities are said to simplify PCB revision; a special "draw-around" feature, for example, lets users capture and manipulate entire sections of a layout as a single entity, the spokesman noted.

PC50 runs on the Tektronix 4051 with 32K bytes of memory, a joystick and plotter, all of which is available from Second Source. The software itself costs $750 and can be ordered from the vendor at 735 Addison St., Berkeley, Calif. 94710.

Book Covers Documentation

ROCHELLE PARK, N.J. — *Organizing and Documenting Data Processing Information*, a 160-page book written by Thomas R. Gildersleeve, is available in paperback for $7.95.

The publisher is Hayden Book Co., 50 Essex St., Rochelle Park, N.J. 07662.

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'PDMS' Runs Inquiries on Micro

BLACKSBURG, Va. — The interactive Personal Data Management System (PDMS) from Microwave Division of PBS Ltd. allows an Altair 8800B user to store, modify and retrieve information from floppy disks directly through a command language or through exits from Basic programs, according to a spokesman.

The data available to the user under PDMS can be a mixture of character fields or "tripleword" length integers, he said. Searches can be for specific information or for matches — or near-matches — of character strings, he added.

The commands available are in English; an operator with only secretarial skills can usually be trained in its use in less than an hour, the company claimed.

32K Memory

The current PDMS implementation is for the Altair 8800B with one or two floppy disks and a minimum 32K memory. Additional versions for cassette systems and for systems based on other microprocessors are under development.

Application packages utilizing PDMS as an access system are also being developed, Microwave said.

PDMS is available on an 8-in. floppy disk for $795. The package incudes a user's manual which contains a source listing of the program, Microwave said.

The company can be reached through P.O. Box 47, Blacksburg, Va. 24060.

Datapro Discusses DBMS

DELRAN, N.J. — "Data Base Management Systems: General Concepts and Planning Guidelines," a seminar for management personnel, data base administrators and systems planners, will be offered this fall by Datapro Research Corp.

The course will explain what data base management systems (DBMS) are all about and where their real economic advantages lie, a spokesman stated.

Costing $425 for Datapro subscribers and $475 for others, the seminars will be given in New York Sept. 28-30 and in late November; in Washington, D.C., on Oct. 12-14 and in December; in both Philadelphia and San Francisco Oct. 26-28; and in Chicago on Nov. 9-11.

Datapro is at 1805 Underwood Blvd., Delran, N.J. 08075.

'Isum,' Nova For Doctors

TRENTON, N.J. — A patient billing, accounting and payroll package for physicians' offices has been developed in Fortran by Isum for use of a 32K Data General Nova.

The facilities of the system are also available from Isum as a customized service, a spokesman added.

Hardware

The recommended hardware configuration includes a Micronova with 32K memory, 10M bytes of diskette storage, a Dasher printer and a CRT. Isum offers that system for $17,000 and the software for an additional $12,000.

Cost of the customized service, done here, is primarily a function of the volume of transactions, the spokesman explained from Isum's offices at 53 N. Post Road, RR1, Trenton, N.J. 08648.

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ADABAS	3.6	3.4	3.7	3.7	2.3	3.2	2.4
IMS	2.9	2.4	2.2	2.5	2.8	2.8	2.9
DL-1	2.6	2.4	2.3	2.4	2.4	2.5	2.6
IDMS	3.8	3.3	3.4	3.6	3.0	3.6	3.5
SYSTEM 2000	3.0	2.6	3.0	3.0	2.5	3.0	3.0
TOTAL	3.5	3.1	3.4	3.4	2.8	3.0	2.6

All figures based on latest available Datapro survey.
*All weighted averages are based on a scale of 4.0 for excellent.
Courtesy of Datapro Research Corporation, Delran, N.J. 08075

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Seminar Schedule

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Chicago	Wed.	Sept.	7
Seattle	Tues.	Sept.	13
San Francisco	Thur.	Sept.	15
Denver	Tues.	Sept.	20
Phoenix	Thur.	Sept.	22
Milwaukee	Thur.	Sept.	29
October			
Minneapolis	Wed.	Oct.	5
Dallas	Tues.	Oct.	11
New York	Tues.	Oct.	11
Atlanta	Thur.	Oct.	13
Hartford, CT	Tues.	Oct.	25
Salt Lake	Thur.	Oct.	27
Rochester, NY	Thur.	Oct.	27
November			
Portland, OR	Tues.	Nov.	1
Indianapolis	Wed.	Nov.	2
Des Moines	Wed.	Nov.	9
Boston	Thur.	Nov.	10
Rochelle Park, NJ	Tues.	Nov.	15
White Plains	Thur.	Nov	17
Philadelphia	Tues.	Nov.	22
Houston	Tues.	Nov.	29
Albuquerque	Wed.	Nov.	30
December			
Miami	Thur.	Dec.	1
Cleveland	Tues.	Dec.	6
Pittsburgh	Thur.	Dec.	6
St. Louis	Tues.	Dec.	13
Cincinnati	Thur.	Dec.	15
January			
Detroit	Tues.	Jan.	17
Columbus, OH	Thur.	Jan.	19
Memphis	Tues.	Jan.	24
Washington, DC	Thur.	Jan.	26
Kansas City	Tues.	Jan.	31
February			
Nashville	Thur.	Feb.	2

DBMS Project Previewed

SCHILLER PARK, Ill. — A multimedia training package called "The Data Base System Project," now available from Deltak, Inc., is the first of a series of courses called "Developing Data Base Systems," a spokesman said.

The series includes the major steps involved in the design and development of a data base system up to, but not including, programming. The "Project" package can be used to train those responsible for starting and controlling a project, he said.

The first course in the package introduces the seven major steps in a data base project, and the second course shows how to carry out the planning phase.

The package is available for purchase or for rent under Deltak's Resource 12 library plan, he said from 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

'Tell-A-Graf' Eases Chart Chores

SAN DIEGO, Calif.— The Tell-A-Graf software from Integrated Software Systems Corp. (Issco) enables clerical, non-DP trained personnel to generate "publication quality" graphics on any vector-mode graphic device linked to an IBM 370 running under OS/-VS, the vendor said.

The package does this, a spokeswoman explained, by combining a high level language processor interpreting English-like commands with the company's current Disspla graphics system software. Tell-A-Graf simplifies the commands needed to generate the graph and includes editing capabilities, she noted.

Once the user has provided formatting instructions and the data to be graphed, the system creates legends, if desired, and scales axes to fit the data. It positions headings and axis labels without operator intervention, she said.

Although still in Beta-test operations at selected user sites, with general release "about six months away," Tell-A-Graf is now available on the National CSS, Inc. remote-computing network, based in Norwalk, Conn.

When it is ready for distribution, the package will cost $19,500, Issco said from Suite G, 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

Loader Ready For CA Syfas

IRVINE, Calif. — A downline software loading capability now available from Computer Automation, Inc. permits users of the company's Syfa systems to transmit application programs and system software throughout a distributed network from a central point, according to a spokesman.

The transmission support has several advantages, he said. Among them are faster distribution of software as it is developed, better backup in case of machine failure and program loss at remote sites and simplified handling of software at the central site as it is being prepared for shipment to the other locations, he claimed.

The new utility, which is free to any synchronous communications-equipped Syfa user, permits loading of either source or object programs at the remote sites. Transmission of source code requires availability of a compiler at the remote location if the program is to be made operational by the staff there.

Computer Automation is at 18651 Von Karman, Irvine, Calif. 92713.

Cassettes Teach BAL for IBM 3

BOWIE, Md. — "Basic Assembly Language Programming for the IBM System 3," a self-instructional package consisting of six audio cassettes and a workbook, requires no prior knowledge of BAL, according to the vendor, the Robert J. Brady Co.

Students are introduced to number systems and basic data concepts. Building on this foundation, the course includes laboratory sessions to be run on an IBM 3, sample printouts, an Ebcdic conversion chart, a hexadecimal addition table and a list of mnemonics, a spokesman said.

The course concludes with a section on subroutines and an appendix outlining a range of debugging tips. The complete package is available for $250 from Brady here in Bowie, Md. 20715.

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TASK/MASTER	3.3	3.2	2.8	3.3	2.5	2.7	2.7
ENVIRON 1	3.1	3.1	3.2	3.1	2.3	2.5	2.5
CICS	3.1	2.8	2.4	2.8	2.8	2.9	2.8
INTERCOM,	2.7	2.8	2.2	2.5	2.1	2.1	2.5
IMS/DC	2.8	2.5	2.4	2.5	3.0	2.9	2.8

*All weighted averages are based on a scale of 4.0 for excellent. Courtesy of Datapro Research Corporation, Delran, N.J. 08075

All figures based on latest available Datapro survey.

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—Harvey Kennedy, Vice President and Director of Management Systems, Southern Baptist Annuity Board (Dallas).

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—Ben Driver, Data Base/Data Communications Software Manager, Brockman On-Line Systems (Houston).

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Math Drill, Practice Uses HIS Level 66 CPU

WALTHAM, Mass. — Schools with Honeywell Information Systems, Inc. large-scale Series 6000 and Level 66 systems can help their math teachers through installation of the Individualized Mathematics Instruction (IMI/66) package from HIS.

The software consists of an integrated set of programs that function as an arithmetic drill and practice system and as an arithmetic test generator.

It also maintains student records dealing with individual and class achievement, enabling the instructor to provide more personal attention to each student, a spokesman said.

IMI/66 does not include any facilities with which an instructor could write any new examples for drill and practice. A "systems-type" person might be able to get into the code, however, and replace some of the current problems with new ones, he said.

The basic system provides a student with drill practice while he is at a terminal connected to the large-scale CPU. Problems can be displayed or printed for student response; the program compares the response with correct answers, replies to the student and presents another problem.

The interactive test-generation system produces tests covering the basic skills of arithmetic. Controlled by the instructor, this portion of the system can tailor tests for each student, building them of any combination of problems selected from 210 learning objectives, the spokesman said.

Written in Fortran, IMI/66 evolved from Model 1600 and Model 400 time-sharing systems. It requires 26K words of main memory and runs in time-sharing mode under HIS Gcos environment.

The math package is available in source and object code form on a fully paid-up license for $1,900, HIS added from its Inquiry Center, 200 Smith St., Waltham, Mass. 02154.

Micro Program System Includes Disk Hardware

SANTA CLARA, Calif. — A "universal" microprocessor development system that includes a dual-floppy disk drive, an interface circuit subsystem card, a read-only memory (ROM) card containing firmware and a disk operating system on a diskette, the IPC-16P/840 package is available from National Semiconductor Corp.

Initially designed for use with National Semi's Pace units, the system can be used with the company's SC/MP and other microprocessors as well, a spokesman noted.

The operating system includes a file management capability, support for assembly programs, editors, linking loaders, utility programs and diagnostic routines, he added.

It can be installed on any IPC-16P Pace development system with 12K words of random-access memory and heavy-duty power supply.

The interface card and the ROM card can be inserted in "any available slots" in the Pace system. The interface card provides protocol for the dual disk drive and an optional CRT: firmware, located on the card, operates the disk mechanisms, formats data and controls data transfers, he said.

A ROM-resident monitor provides the user wth control over system configuration and program execution. Single-word commands supply linkage to paper tape loader, card reader loader, diskettes and a debugging subsystem, the spokesman said.

The complete IPC-16P/840 package, including the disk drive, costs $4,500. Delivery is 30 days after receipt of order, National Semi's Microcomputer Systems Group said from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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Bank Installs Direct Link to 'Fed' CPU

By Stewart M. Shacter
Special to CW

ST. PAUL, Minn. — The First National Bank of St. Paul here has developed a processor-to-processor link between its minicomputers and the Federal Reserve Bank's communications switch in Minneapolis.

This link is between the bank's Digital Equipment Corp. PDP-11 processors and the "Fed's" IBM 370/145 with an IBM 3704 front end.

The direct communications link has increased the efficiency of transmitting financial data through the Federal Reserve System by allowing a greater transaction volume without an increase in staff size. For example, the bank has increased the daily number of transfers from 450 to 600, totaling an average of $600 million.

In addition to dropping the per-unit cost of each transfer through the Fed by 30%, the system has provided better service to St. Paul and its customers, permitted greater accuracy of data and, therefore, increased the security of the system.

Application System

The bank uses computer communications in its funds transfer operations, and the Federal Reserve Communication System (Fed Wire) is a major route for domestic money transfers.

Until recently, all electronic links between member banks and the Federal Reserve regional centers were terminal-oriented, with paper tape readers at member banks providing the fastest interface available.

To efficiently handle the increasing volumes of funds transfers, it became necessary to replace this terminal interface with higher speed processor links.

The First National Bank had previously developed a minicomputer-based Fed Write application system. Running a a PDP-11/45 RSTS system, the application programs provide for data entry, internal controls, management reports and an interface to the checking system.

This application system, installed in June 1975, greatly reduced the internal handling time for the processing of Fed Wires. The interface with the Fed was accomplished by having the system punch a paper tape that was input into a paper tape reader tied directly to the Federal Reserve Bank's equipment.

The automated application and the computer-assisted terminal link served the bank until the volume of transfers began to approach the functional capacity of the terminal. At that point, the bank began to study the feasability of a direct processor link to its Federal Reserve regional communications switch.

Linking the application processor directly to the Fed system was initially considered the best approach for establishing the link. However, it was quickly proven the time-sharing system could not efficiently handle both the application and communications.

Further, not only did the bank want an inexpensive system, but one which was versatile enough to be expanded for future needs. Commercially available message switching "front ends" which were studied were either too expensive or too inflexible.

User in Control

The bank decided to purchase a PDP-11/10 processor and write the communications software in-house. This software, which runs stand-alone on the processors, provides all the necessary functions normally associated with an operating system such as device handling, line protocol support and dynamic management of available memory.

As a front end for the PDP-11/45 RSTS application computer, the PDP-11/10 acts as a buffer, protecting the user-oriented RSTS system from the constant interrupts of external communications lines.

Since the RSTS system controls the communication line between itself and the front end, the movement of information between the PDP-11/45 and PDP/11/10 does not degrade the service given to terminal users of the time-sharing system.

Special features above the necessary communication facilities were included to allow for strict control over the communications lines. From the application terminals operators can "disable" communications, causing the front end to refuse all requests from outside networks.

Currently, the Fed Wire network is the only system to which the bank's frontend is linked. Other funds transfer networks are beginning to allow for processor-to-processor links, and the front end could be modified to handle them also.

Down-Line Loading

A significant savings was realized by down-line loading the communications software from the 11/45 to the 11/10. This means that the communications program is stored on disk on the 11/45.

(*Continued on Page 50*)

Serial Box Holds Alpha Bits

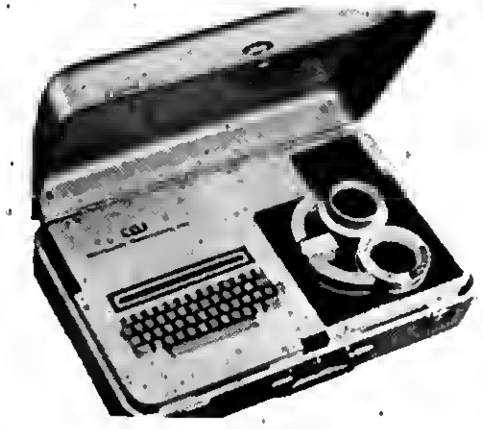
LANHAM, Md. — The Serial Box is a portable, interactive terminal capable of interfacing to mini- or microcomputers through its RS-232 or current-loop port, according to its vendor, Computer Operations, Inc.

The terminal comes in two versions: the CO-4410 and the CO-4420, both of which can transmit data at selectable speeds from 110- to 9,600 bit/sec.

The CO-4420 consists of a direct-access tape drive with a capacity of 1M byte, a full Ascii keyboard, 40-character plasma display, the RS-232 interface and a microprocessor controller, Computer Operations said.

The CO-4410 does not come with the display or keyboard. It was designed to add direct-access mass storage capability to any CRT or hard-copy terminal via a second RS-232 or current-loop port, the firm noted.

The Model 4420 was designed for noncomputer room enviroments and in applications such as data loading/logging in the field, oil exploration and medical and university environments.



Serial Box

Prices are $3,850 for the Model CO-4420 and $2,850 for the CO-4410. Computer Operations is at 9700-B Palmer Highway, Lanham, Md. 20801.

Correction

NCR Corp.'s Distributed Network Architecture (DNA) [CW, Aug. 22] is not based on the CCITT X.25 protocol recommendation, but will provide the means to derive links from public data networks based on X.25. In addition, NCR will make a commitment to be compatible with non-NCR communications and networks; the company will announce this month how the 721 communications processor, which "has been in existence for some time," will fit into the DNA concept.

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BASF invented magnetic tape 40 years before Memorex broke their first glass.

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Computer Tapes Disk Packs Flexydisks Word Processing Supplies

Harris 1600 Gets Floppies

DALLAS – Harris Corp. has added flexible disk storage for its 1600 family of remote batch terminals and distributed processing systems.

The 1600 diskettes can be advantageous in remote data collection store-and-forward applications employing IBM 3741 or equivalent technology, according to a spokesman for Harris' Data Communications Division here.

The diskettes can be used for mass storage autoload (initial program load); 3741-compatible read; and media conversion such as diskette-to-print, diskette-to-tape and diskette-to-cartridge disk, he said.

As many as three controllers and nine flexible disk drives can be used with larger 1600 systems to provide up to 2.2M bytes of flexible disk storage. Each diskette has a capacity of 1,898 128-char. records for a total of 242,944 char. per diskette, the spokesman noted.

The diskettes can operate under Harris' Communications Operating System (COS) or Extended Communications Operating System.

Either system can process single or multivolume diskettes. IBM 3741-compatible data sets may be processed and transferred without regard to multivolume indicators, volume sequence or end-of-file indicators, Harris claimed.

The Harris 1662 flexible disk controller and F662 flexible disk drives can be purchased for $2,200 each. A three-year lease for a single controller and drive, including maintenance, is $105/mo, the spokesman noted from 11262 Indian Trail, P.O. Box 44076, Dallas, Texas 75234.

Unit Allows Speed Upgrade

ROCKVILLE, Md. – Syntech Corp. has introduced the MPB-200C, a character-oriented converter/buffer said to allow most asynchronous communications systems to be upgraded to the higher speeds of synchronous operation.

The device can be used in terminal-to-terminal or computer-to-terminal applications operating on the dial-up network or on point-to-point and multipoint private lines, according to Syntech.

It will operate in full- or half-duplex modes as well as in a simplex mode on two- or four-wire lines as required by the attached modem, a spokesman noted.

In operation, the MPB-200C accepts machine- or hand-keyed data in an asynchronous character format at transmission speeds from 1,200- to 9,600 bit/sec. It accepts synchronous data from the modem receiver and delivers it to the terminal or CPU in the original format, but at the higher transmission rate, Syntech said.

The converter/buffer requires no adjustments except for the selection of the desired operating speed, according to the firm. It comes with an EIA cable and interface and costs $500, the spokesman said from 11810 Parklawn Drive, Rockville, Md. 20852.

Bank Links CPU Directly to Fed

(Continued from Page 47)

Whenever it is necessary to reload the system (because of testing or failure recovery), a new copy of the communications program is sent down the communications line to the 11/10, where it is loaded into memory through use of a down-line loading bootstrap.

Because this procedure is needed only rarely (perhaps twice per month), the four- to five-minute reload time is not a factor. However, because it eliminates the need for disk space on the front-end, the resulting system is cheaper and more reliable.

Finally, the ultimate point of interaction between the application system and the communication system had to allow both systems controlled access to the relevant information.

A program running in "detached" mode on the application computer continually monitors the application transaction files for outgoing messages and periodically polls the front end for incoming messages.

Outgoing messages are not transmitted until the users "release" them after performing application balancing procedures. Incoming messages are immediately put into the application transaction files, where they are available for review by the users.

For the systems now implemented, the Digital Data Communications Message Protocol (DDCMP) is used between the two in-house DEC computers, and the IBM 2740-2 protocol is implemented between the bank and the Federal Reserve district switch in Minneapolis.

The front end software is written in Macro, the assembler language of PDP-11 processors. The communications handler for the RSTS system is written in a high-level language developed by the bank to provide for facilities not available in the DEC Basic-Plus language. The code is translated into standard Basic-Plus for execution.

The PDP-11/45 RSTS mini supports a variety of applications including a securities trading and accounting system and a federal funds information system. It is anticipated that these current and other future systems will make use of the new communications facilities.

Implementation of the system has resulted in both cost savings and operational advantages.

Shacter is senior systems analyst at the First National Bank of St. Paul. He is responsible for the design and implementation of various financial systems, including the new front-end communications system.

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Basic/Four Systems are also marketed in more than 30 foreign countries.

Chip Controller Converts Data To SDLC, HDLC and ADCCP

HAUPPAUGE, N.Y.—Standard Microsystems Corp. (SMC) has introduced a programmable MOS/LSI chip controller that places data in IBM's Synchronoos Data Link Control (SDLC) and other high-level protocols.

The COM 5025 controller is a 40-pin monolithic integrated circuit utilizing an n-channel silicon gate process that can replace op to 300 integrated circuits and operate at speeds up to 2M bit/sec, SMC said.

The controller was designed for OEMs, but end users can utilize it in their systems' components with appropriate software changes or additions, according to a spokesman.

The device is a universal transmitter receiver for dedicated control and implementation of all major protocols including bit-oriented types such as SDLC, Higher Level Data Link Control (HDLC) and the Advanced Data Commonications Control Procedure (ADCCP), as well as byte-oriented protocols soch as Bisynch, SMC claimed.

The COM 5025 is the first programmable chip controller approved for these protocols and the only one that can process both SDLC and HDLC protocols, according to SMC.

Compatible with 8- or 16-bit processors, the TTL-compatible onit contains selectable protocols and a tristate I/O bus, SMC said.

Double Buffering

The data, statos and control registers are double boffered. Full- or half-duplex operation is provided by means of independent transmitter and receiver clocks, the spokesman added.

Data lengths are individually selectable for receiver and transmitter from 1- to 8 bits. Data, statos and control registers are linked to a master reset which reportedly initializes them to the SDLC protocol on power-up.

The controller of the device is responsible for all higher level decisions and interpretation of some fields within message frames, SMC stated.

For bit-oriented protocols such as SDLC, HDLC and ADCCP, the COM 5025 provides bit stuffing and stripping, automatic frame character detection and generation and residoe handling, SMC said.

Options for bit protocols include variable-length data (1- to 8-bit bytes), error checking — 16-bit polynomial cyclical redondancy character (CRC) or CCITT, primary or secondary station address mode, extendable address field to any nomber of bytes, extendable control field to 2 bytes and idle mode to transmit flag characters or mark the line.

For byte-oriented protocols, the COM 5025 featores automatic detection and generation of Sync characters. Options such as variable-length data, variable Sync characters (5-, 6-, 7- or 8 bits) and error checking (16-bit polynomial CRC or CCITT, as well as odd/even parity, deletion of leading Sync characters after synchronization and an idle mode to transmit Sync characters or to mark the line are also provided, SMC noted.

The multiprotocol controllers cost $94 each in single quantities and $62 each in qoantities of 250, the spokesman noted from SMC at 93 Marcus Blvd., Haoppaoge, N.Y. 11787.

Conference to Mull SNA

CAMBRIDGE, Mass.— A two-day conference on the impact of IBM's Systems Network Architecture (SNA) will be held Sept. 20-21 in New York by The Yankee Group.

Aimed at "osers who must make white-knuckle decisions over the next year" related to SNA, the conference will include discussions on such topics as the mainframe goals of SNA; growth in networking; transmission facilities to be offered by Satellite Business Systems; terminal trade-offs; and considerations of the large user.

Called "The IBM Grand Design: SNA, SDLC and SBS," the conference will be held at the Harvard Club in New York. Registration for the two-day meeting is $550. Further details are available from The Yankee Group, Box 43, Cambridge, Mass. 02138.

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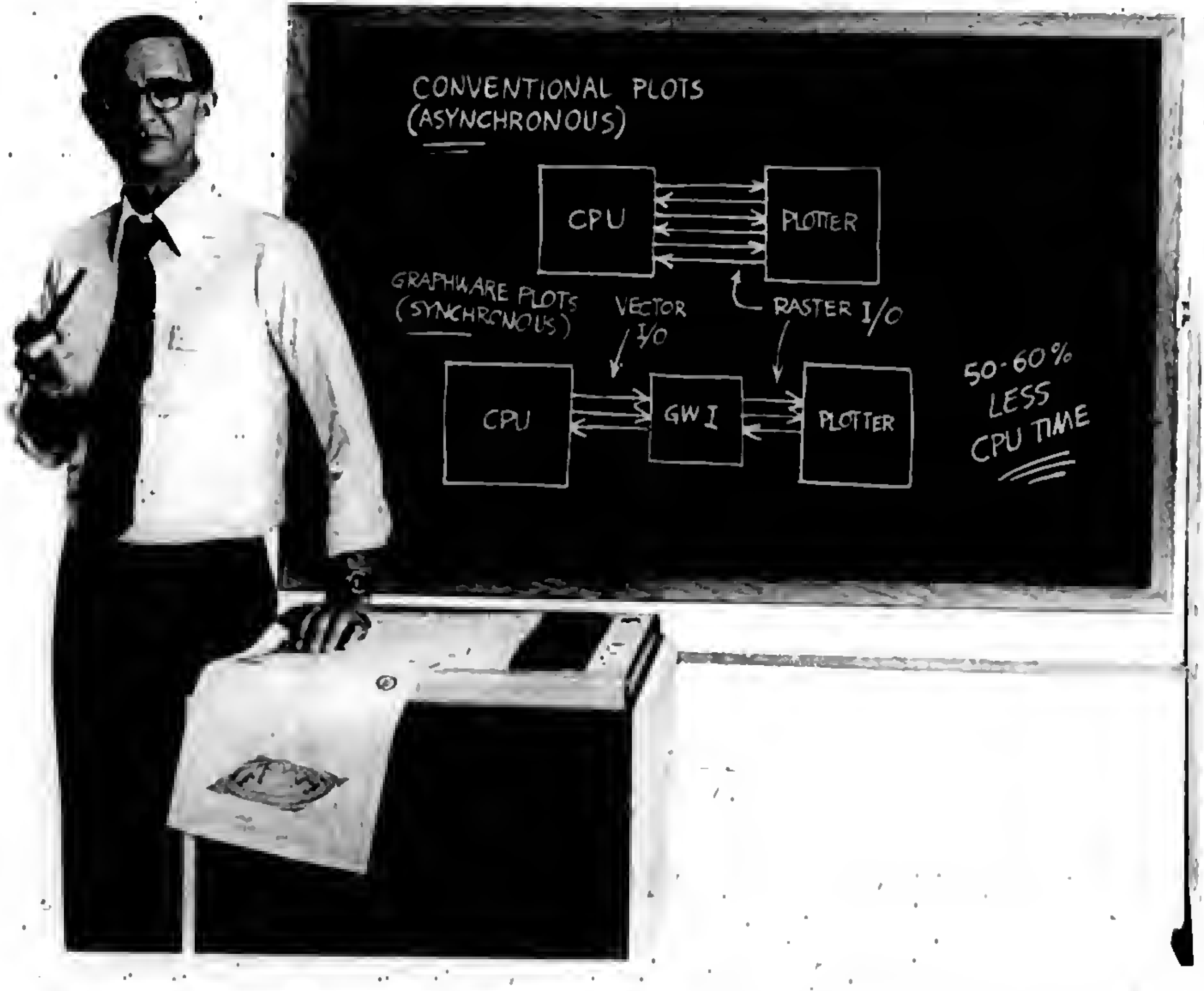

Controller Eliminates TTYS

CHATSWORTH, Calif. — The Model 180 multichannel data logger from Micom Systems, Inc. is an intelligent terminal controller that reportedly permits up to eight pieces of test equipment, each producing a printed output log, to share a single teletypewriter (TTY).

The Model 180 is equally suited for use with computer systems, data concentrator systems, switching systems or any other type of intelligent asynchronous controller provided with a statistics output or operator's console interface, Micom said.

Each of the operator's console or test equipment log output interface is connected to one of eight ports on the Model 180; each of the ports is capable of receiving messages concurrently at up to 300 bit/sec, according to the firm.

The port connecting the terminal is switch-selectable to operate at 110-, 150-, 300- or 1,200 bit/sec.

The terminal used with the controller/logger can be attached remotely through modems, permitting a single terminal using one telephone line to monitor several remotely located pieces of equipment or intelligent controllers, Micom noted.

The device comes with serial asynchronous RS-232C channel interfaces; current loop interfaces are also available, a spokesman noted.

The Model 180 multichannel data logger costs $2,600 from Micom at 9551 Irondale Ave., Chatsworth, Calif. 91311.

Oscilloscope/Terminal Duo Processes Waveform Data

BEAVERTON, Ore. — Tektronix, Inc. has introduced a waveform processing system consisting of its digital processing oscilloscope and the Tektronix 4051 intelligent graphics terminal. The system provides waveform acquisition, digitizing, processing and display of the data.

Tektronix Waveform Processing System

The digital processing oscilloscope portion of the system is based on the 250 MHz Tektronix 7704A oscilloscope. Waveform digitizing and data storage facilities (512 data point/trace) for up to four traces are added to the basic oscilloscope, the company said.

The digitized waveform is displayed on the 7704A's CRT along with alphanumeric messages such as waveform scale factors.

Broad waveform acquisition capabilities are available by selecting from the 7000 series of amplifier time base, spectrum analyzer, digital multimeter and counter plug-ins, Tektronix noted.

Waveform calculations such as addition, multiplication, integration, differentiation, fast Fourier transform, inverse Fourier transform are performed on the 4051 intelligent terminal using the Plot 50 programming language.

Up to 32K bytes of working memory are available on the 4051 plus a 300K-byte cartridge tape unit. Other features include 20 user-definable functions, 10 line editor functions, a 128-character Ascii keyboard with upper and lower case, and IEEE 488 1975 interface, Tektronix stated.

Price of the system with the digital processing oscilloscope, 4051 intelligent graphics terminal and 32K bytes of memory is $28,505.

The 4631 hard-copy unit adds $4,295 and the data communications interface for the 4051 costs $1,500. The system has a 20-week delivery schedule from the firm, which can be reached through P.O. Box 500, Beaverton, Ore. 97077.

Qualterm Unit Portable

MOUNTAIN VIEW, Calif. — Qualterm Terminals has introduced two portable desktop versions of its daisy wheel-equipped 55 char./sec communications terminal for business data communications applications.

The keyboard/printer QT-P55 and the receive-only QT-R55 have been reduced in size and weight to less than 50 pounds, Qualterm said.

Transmission speed can be either 600- or 1,200 bit/sec.

The QT-P55 costs $4,450 and the QT-R55 costs $4,200; lease prices are $131/mo and $124/mo respectively on 27-month plans.

The firm is at 453 Ravendale Ave., Mountain View, Calif. 94043.

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GDC Extends Line With Multiplexer, Modems

WILTON, Conn.— General Datacomm Industries, Inc. (GDC) has extended its communications product line with the introduction of a time-division multiplexer (TDM) and two modems.

The TDM-1253 multiplexer has the capacity for up to 12 data channels and can handle synchronous, asynchronous and isochronous data at channel speeds from 50 bit/sec to 72 bit/sec, according to GDC.

The multiplexer has local and remote system and channel alarms and diagnostics; it is said to accommodate high-speed lines from below 2,400 bit/sec up to 300 kbit/sec.

The unit can operate on voice-grade lines, wide-band circuits, satellite links and digital transmission networks including Bell's Digital Dataphone Service, GDC said.

Two optional circuit cards can be added to expand the capability of the TDM-1253: a plug-in test card to monitor and display the high-speed aggregate data stream error rate and, in systems where EIA controls are not required, a remote alarm and loopback card to provide remote alarm and test functions.

LSI Modems

In addition to the multiplexer, GDC also introduced two modems with LSI circuitry.

The GDC 2400 EP is a synchronous modem that can handle data transmitted at 2,400 bit/sec over two- or four-wire leased lines. It offers CCITT compatibility and has optional remote diagnostics for point-to-point and multipoint applications, signal loopback capabilities and a modem self-test function, according to the firm.

An optional synchronous remote control (SRC) plug-in module reportedly extends the remote diagnostic capability of the modem in multipoint applications.

GDC's 1200 EP modem functions asynchronously at speeds up to 1,200 bit/sec and synchronously at 600- or 1,200 bit/sec in half- or full-duplex modes over leased lines in point-to-point and multipoint applications.

Standard features of the 1200 EP include signal loopback diagnostics, selectable request-to-send/clear-to-send delays, selectable carrier detect levels and local and remote transmission speed control.

In synchronous applications, an optional SRC is available that is addressable from the central site to accept and decode diagnostic commands.

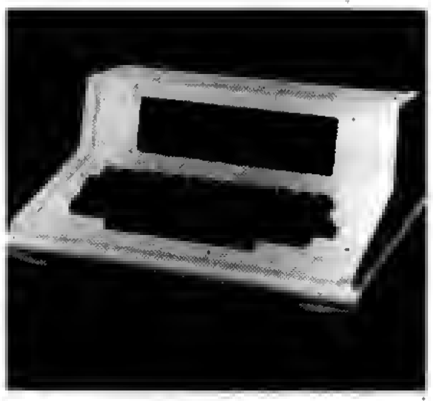
Both modems are available in stand-alone or rack-mounted configurations. The 2400 EP costs $1,072 and the 1200 EP costs $671. The SRC module for either modem costs $214.

The TDM-1253 multiplexer is priced at $1,950. GDC is at 131 Danbury Road, Wilton, Conn. 06897.

Transactor I Is CRT Alternative

GRANDVIEW, Mo. — Computerwise, Inc. has introduced a small alphanumeric display terminal designed as an alternative to a CRT.

The Transactor I consists of a single-line, 32-character gas discharge display with a 5 by 7 dot matrix and a 53-key teletypewriter-style keyboard.



Transactor I

It can be attached to computers with an RS-232 or 20mA current-loop interface.

Switches allow the user to select the operating mode including 110- to 9,600 bit/sec transmission; full or half duplex; even/odd or no parity; five to eight data bits; and one or two stop bits, Computerwise added.

Applications include retail sales, hospital patient accounting, general accounting, inventory control, computer programming, production control and instrument monitoring, according to the firm.

Price of standard Transactor I in quantity is $595. Computerwise is at 4006 E. 137th Terrace, Grandview, Mo. 64030.

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Terminal Transactions

292-Page Revision

Auberbach Updates Terminal Book

By John P. Hebert
CW Staff

PENNSAUKEN, N.J. — Because it is difficult to determine exactly what an intelligent terminal is, Auerbach Publishers, Inc. has updated its "Guide to Intelligent Terminals" to include "the genuinely intelligent terminals."

According to the 292-page guide, an intelligent terminal is one that can be programmed to perform certain functions that would otherwise require the services of the CPU to which it is attached.

After explaining what comprises an intelligent terminal, the publication considers terminal system procurement and describes qualities users should evaluate carefully.

It then devotes 251 pages to a description of each terminal chosen for the report, usually including an overview, the terminal's compatibility with host CPUs, its performance, user reaction, system design and peripheral equipment availability. It then usually describes data communications particulars, available software, maintenance and pricing for each vendor's intelligent terminal offering.

Some of the above categories are absent.

Overall, the publication would help users narrow the choices of available intelligent terminals.

It costs $24.95, Auerbach said from 6560 N. Park Drive, Pennsauken, N.J. 08109.

Tape Terminal Announced

CINCINNATI — LeBlond, Inc. has a punch tape communications terminal which it said can prepare, edit and duplicate numerical control program or machine tapes under microprocessor control.

The DPS-4000 can read, punch or convert EIA, Ascii or Binary codes. It can punch foil-laminated tape or other materials at a speed of 75 char./sec while providing tape verification with a read-after-punch feature, LeBlond claimed.

The terminal can communicate with time-sharing networks at 10-, 15- or 30 char./sec and can reduce time-sharing costs by performing editing and storage functions usually done by the time-sharing computer system, according to the firm.

A maintenance and training support program is offered by the company, including a library of hardware self-diagnostic routines, LeBlond noted.

Prices for the tape terminal start at $6,750, the company said from Madison at Edwards Road, Cincinnati, Ohio 45208.

IEE Has 14-Member Family Of Plasma Display Units

VAN NUYS, Calif. — Industrial Electronic Engineers, Inc. (IEE) has announced a 14-member family of alphanumeric plasma display subsystems called Argus.

The IEE-Argus display subsytsems utilize message panels to provide a display of characters in 5 by 7 dot-matrix format with standard underline and cursor capability, the company said.

The 14 subsystems make up two series — "mini" or "maxi" — that are distinguished primarily by different character sizes and consequent overall size, weight and power consumption.

Character sizes available are .21 in., .25 in. and .33 in. Models are available in character capacities of 32 (16x2), 64 (16x4), 128 (32x4) and 256 (32x8), IEE said.

All subsystems are available in either neon-orange or green. Synchronous, asynchronous and addressed-location loading modes reportedly promote versatility and straight-forward interfacing.

All signal inputs and the one output are TTL, and no intricate signals or critical timing is required, the company claimed.

Each system is compactly housed with multiple mounting methods provided. Optional accessories such as universal input power supplies, contrast enhancement filters, mating connector, cable assemblies and serial data converters are available.

Prices for the Argus family range from $80 to $900, IEE said from 7740 Lemona Ave., Van Nuys, Calif. 91405.

Voice-Response Terminals Suited for Pocket, Desk

ANN ARBOR, Mich. — Interface Systems, Inc.(ISI) has introduced a family of voice response Touch-Tone-type terminals.

The T-16 is a pocket-size 16-key numeric terminal and the T-48 is an alphanumeric desktop terminal which includes a volume control and a headset jack.

The T-48 uses a programmable read-only memory (Prom) for storing user-specifiable Touch-Tone codes, according to ISI.

Tone signaling is the standard "two of eight," which is said to be compatible with AT&T models 403 and 407 data sets.

Prices for the T-16 begin at $92. The T-48 with the volume control and headset jack costs $425. Without control or jack it costs $350, an ISI spokesman noted from 462 Jackson Plaza, Ann Arbor, Mich. 48103.

Compact CRT Bows

MAMARONECK, N.Y. — Teleram Communications Corp. has introduced the Model P-1881, a portable CRT terminal.

The P-1881 is a compact device able to fit under an airplane seat. It contains a 7-in. CRT, Ascii keyboard with upper- and lower-case alphanumerics and editing features.

Its 8,000-char. buffer memory can be preserved even when the machine is disconnected from line power.

Price for the basic P-1881 terminal is $3,995, Teleram said from 1032 Mamaroneck Ave., Mamaroneck, N.Y. 10543.

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Modem for Terminet 30

CAMDEN, N.J. – The DE-100 TWX/DDD data set available from RCA allows utilization of the high-speed GE Terminet 30 teleprinter on the TWX network as well as in Bell Dataphone applications.

The unit automatically senses and adjusts printer speed to the incoming call – 30 char./sec for Dataphone, 10 char./sec for TWX – and meets Federal Communications Commission (FCC) certification requirements for direct-access arrangements, RCA said.

The DE-100 data set for a Terminet teleprinter costs $95/mo on a one-year lease, $70 to install and $40 to remove, according to an RCA spokeswoman.

The unit is also available on a purchase basis, she said from Dept. 2610, Bldg. 204-2, Camden, N.J. 08101.

Terminal Transactions

Processor Terminal Runs Alone Or as Remote Peripheral System

HOUSTON, Texas – TEI, Inc. has introduced the Model MCS-PT processor terminal, which can either be a remote peripheral device or a self-contained terminal system with CRT, disk storage, keyboard ~~and~~ a 12-slot motherboard.

Features of the processor terminal include a 15-in. reduced glare monitor, a full upper- and lower-case Ascii keyboard with eight user-defined function keys, and a 16-key numeric pad.

The 12-slot mainframe contains a CPU board that features an Intel Corp. 8080 processor and a special circuit that implements a start-up "jump to" routine to any user-selected byte address, TEI claimed.

The I/O board provides three parallel and three serial ports with selectable transmission rates from 75- to 19,200 bit/sec. Outputs are RS-232C or TTL, according to TEI.

Software provided includes CP/M DOS and Basic on disk. the processor terminal is priced at $3,495; and in kit form it is priced at $2,995, TEI stated. The unit is also available without the disk drive and controller for $2,495 assembled or $2,195 in kit form. The company is at 7231 Fondren Road, Houston, Texas 77036.

Control Unit For Teletype Cuts 'Junk'

WATERTOWN, Mass. – Digital Laboratories has brought out a "smart" motor control unit that reportedly allows a Teletype Corp. teletypewriter to print and punch paper tape without producing "junk" characters during an of/off cycle.

The Model TR20 is an external motor control with a six-character storage capability that provides a .6-sec delay for the teletypewriters motor to speed up and print, the company said. No programming changes or lead-in characters are required.

A bypass switch has been integrated in the Model TR20 to permit standard keyboard operation. An adjustable timer provides up to a 20-sec turn-off delay.

However, in the event of an unexpected delay between transmitted characters, there will be no data loss, it claimed.

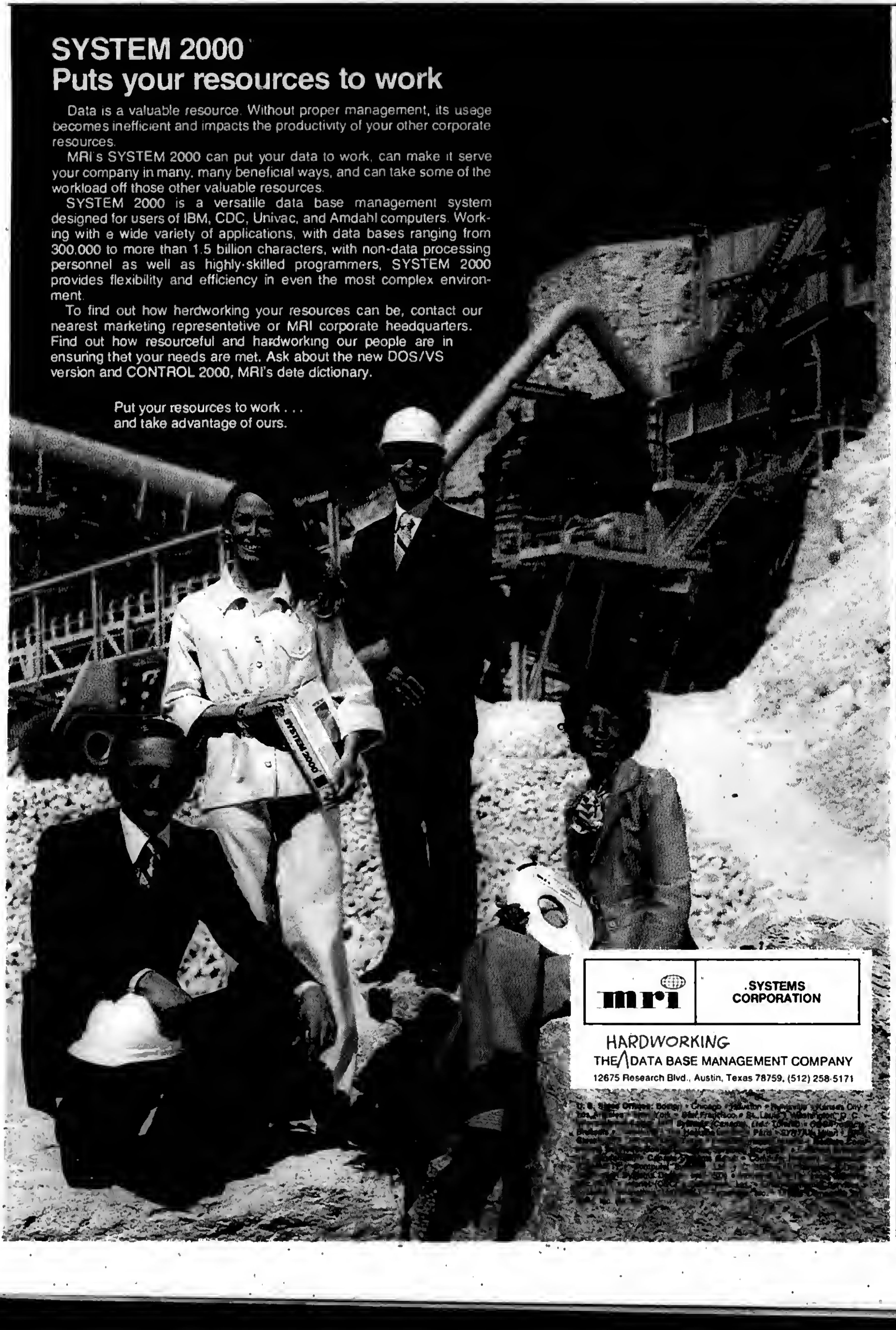
The unit sells for $175 from Digital Laboratories at 600 Pleasant St., Watertown, Mass. 02172.

Hazeltine CRTs Get Price Tags

GREENLAWN, N.Y. – Hazeltine Corp. recently released prices on its models 1510 and 1520 CRT terminals introduced last June at the National Computer Conference.

The 1510 costs $1,395 and the 1520 multiprocessor terminal system costs $1,650.

Hazeltine delayed divulging the prices of the terminals because of a "Guess the Price" contest held at NCC. Thomas W. Cook, senior engineer for Mobil Oil Corp., won the contest.



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Productivity Up 15%

Multimedia Data Entry Boosts Output

By Jeffry Beeler
CW Staff

KENILWORTH, N.J. — A service bureau here has boosted its overall productivity by an estimated 15% to 20% in the two years since the firm replaced its keypunch machines with a multimedia data entry system. And for some jobs, the equipment change has increased CMF Key Services' productivity by as much as 100%, according to Fred Beyer, the company's vice-presidnt and cofounder.

This jump in efficiency has raised the data entry service firm's average output of computerized records to 60,000 a day (or about 15 million to 20 million a year) and has boosted its revenues from $780,000 in 1975 to a projected $1.2 million this year.

Beyer partly attributed this higher productivity to the company's decreased use of punch cards. Before it installed the current data entry system, CMF supplied its customers with about 1:5 million punch cards a month at a cost of about $2,000 to $3,000.

He also credits the system with expanding the number of recording media the firm can accommodate in-house. With the keypunch machines it used previously, the company could make in-house data recordings on only one medium. If a customer required input on a medium other than punch cards, CMF had to send the data to an outside contractor for recording.

Expanded Service

Today, the firm can enter data in-house, not just on the traditional punch cards, but also on cartridge disks and 9-track magnetic

(Continued on Page 62)

DP Bureau Establishes 'Secure' Facility

By Lawrence A. Yaggi Jr.
Special to CW

SACRAMENTO, Calif. — "Given the choice, I'd specify a reinforced-concrete, windowless building within a reinforced-concrete windowless building, security systems on both and a secured perimeter with single-access control. I'd design, in other words, a building for computer use," according to Joe Pujals, assistant security oficer at the Stephen P. Teale Consolidated Data Center here.

Pujals recently commented on problems faced by Teale Data Center in securing the second floor of a conventional office building.

Teale Data Center is a state-operated computer service bureau serving 59 other state agencies for normal operational business. The facility occupies 10,000 square feet, of which 3,000 are devoted to storage of 43,000 data reels in the tape library. Total on-line storage capacity is 10.8 billion bytes of data.

Two loosely-coupled IBM 370/168 mainframes are used, operating under ASP SVS. Peripherals include 28 tape drives, 64 double-density disk drives, three 2,000-line/min printers and 31 remote job entry terminals in the field among the center's 59 clients. The installation employs 179 people, most of whom work in the computer room.

Subject to Hazards

Teale is subject to all the hazards peculiar to any major DP facility: stray electromagnetic radiation of some magnitude (e.g., from a welding machine); electronic theft; fire; the need for data privacy; and physical or electronic theft by a "disgruntled employee."

While security is always a concern, it is a more difficult problem if the site selected is a block-sized, multistoried, general office building, as in this case, according to Pujals. The building is conventionally windowed and lobbied, and the existing tenant (Teale's lessor) maintained security with guards (State Police Officers) patroling all entrances, the grounds and the parking lot. In this instance, the lessor also occupied a smaller building across the street.

Coordination Necessary

As a new tenant, Teale Data Center had to coordinate its own security arrangements with those of the lessor for mutual access and total security for both buildings. This had to be done "reasonably," yet with total control of access and identification.

Since security considerations were not part of the original architectural plan, there was no practical way to seal off the second floor, which could be reached from the lobby by both escalators and elevators. Yet the lessor, whose service allows public access to all floors during daylight hours, also maintained a DP facility on the floor Teale would occupy.

When the site was selected, many security needs were recognized. An immediate problem was access to the computer room.

This was met with one mantrap entry-exit booth at the entrance to the computer room. One of-

(Continued on Page 60)

On-Line Microfiche Unit Interfaces to 360, 370 CPUs

NEW YORK — Datagraphix, Inc. has introduced an on-line Autocom microfiche recorder/processor that interfaces to an IBM 360/25 or larger or to any 370, the firm said here.

The unit connects to the IBM byte multiplexer, block multiplexer or selector channels and can operate up to 150 feet from the CPU, depending upon the host system, a spokeswoman said.

Converts Data

The Autocom unit converts data from the IBM mainframe into 4 in. by 6 in. microfiche, each containing the equivalent of up to 270 pages, she said.

For certain repetitive jobs, no operator intervention is needed. After the recording command is queued in directly from the CPU, the Autocom automatically receives the data and produces the cut, dry microfiche, she added.

The on-line unit utilizes a 16,000-byte buffer memory and offers 42x or 48x reduction, standard or optional full-reversal film processing, up to 12,000 line/min recording speed and an optional 1,600/6,250 bit/in. tape drive for on-line or off-line operations.

The Autocom sells for $61,000 and deliveries will begin in February 1978. The tape drive costs $39,000 and will be available at the same time from the firm at P.O. Box 82449, San Diego, Calif. 92138.

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In 24 University Departments

TS System Helps Students Learn, Recall More

NEWARK, Del. – Classrooms at the University of Delaware here are online to a time-sharing system in Arden Hills, Minn., and teachers are using the system to help students learn such diverse subjects as agriculture, biology, home economics, art and music.

The students are enjoying it immensely, according to Dr. Fred Hofstetter, music professor. He noted that with the aid of the time-sharing system his students are increasing their music sensitivities, spending less time completing course requirements and making higher grades.

"Most importantly, many of the students are experiencing the fun of learning for the first time," he said.

It all began two years ago when the university installed one terminal for faculty experimentation. That experiment drew such enthusiastic response that today the university has a network of 32 terminals that deliver educational materials in the form of text, drawings and animated graphics for 24 different academic departments. Nearly 100 faculty members are involved in developing instructional materials for the system.

The system, Control Data Corp.'s Plato, is based upon a CDC Cyber 70 Model 73-28. The dual CPU system has 131K bytes of memory with 2 million words of extended core storage and 12 double-density Model 844 disk drives.

Plato delivers instructional materials in whatever form the author of the lesson designates. Students communicate with the lesson through the terminal's keyboard or by merely touching the screen with a fingertip. Through these two methods of communication, they answer questions, make choices, change the displayed materials or ask for help.

Instructors use the same terminals to develop and update lesson materials and also to check on student performance and time at the terminal, which the system records and processes into whatever reporting format the teacher wants.

Hofstetter, who is director of the university's Plato project, spearheaded the introduction of computer-based education on the campus through the development of several music courses which he then demonstrated to his colleagues. The courses took advantage of the system's speed, animated graphics and touch-sensitive display screen.

He even attached a random-access audio unit and a four-voice synthesizer to the terminal for an ear-training course called Guido. Musical notes displayed on the screen correspond with the sound to help students master the complexities of reading music so they can recognize and correct errors in musical performance.

For drill and practice in music intervals, students merely touch one of the interval names displayed on the Plato CRT screen and it is played by the CPU-controlled synthesizer.

Or, in a reverse exercise, the synthesizer will play a musical interval, and the students can identify it by touching its name in the list displayed on the screen. The system immediately flashes a responding message: "That's right," or "Wrong, try again,"

"When drill and practice is done in a self-paced environment such as this, learning is more efficient," Hofstetter said.

"Precious class time formerly devoted to drills can be spent in concept development and more creative aspects said.

Idea Spread

What Hofstetter experienced in computer-based music instruction was soon shared by instructors in agriculture, art, education, home economics, nursing, physical education and even drama, as they implemented Plato in their courses.

In the College of Agriculture, students use Plato for study in plant science, animal science, agriculture engineering and entomology. Courses in genetics and veterinary science use Plato to multiply fruit flies and study animal anatomy. This reduces time-consuming field and laboratory projects, according to Dr. Donald Fieldhouse, professor of agriculture.

For example, in a plant science lesson, students are asked to select the proper chemical treatment for a drooping, ailing plant that is displayed on the screen. If the student selects the proper chemical, the plant immediately straightens into a healthy-looking specimen. If the wrong chemical is prescribed, the plant withers and dies – on the screen. But it can be redisplayed in its former state for another remedial treatment.

Aid to Memory

"This type of instruction is not only entertaining, but students tell me it helps them remember data better than if they read it from a textbook or chart," Fieldhouse said.

In the art department, students are using the graphics and touch capabilties of Plato to study design, type faces and lettering techniques. For example, letters in a particular type style are displayed on the screen for

(Continued on Page 64)

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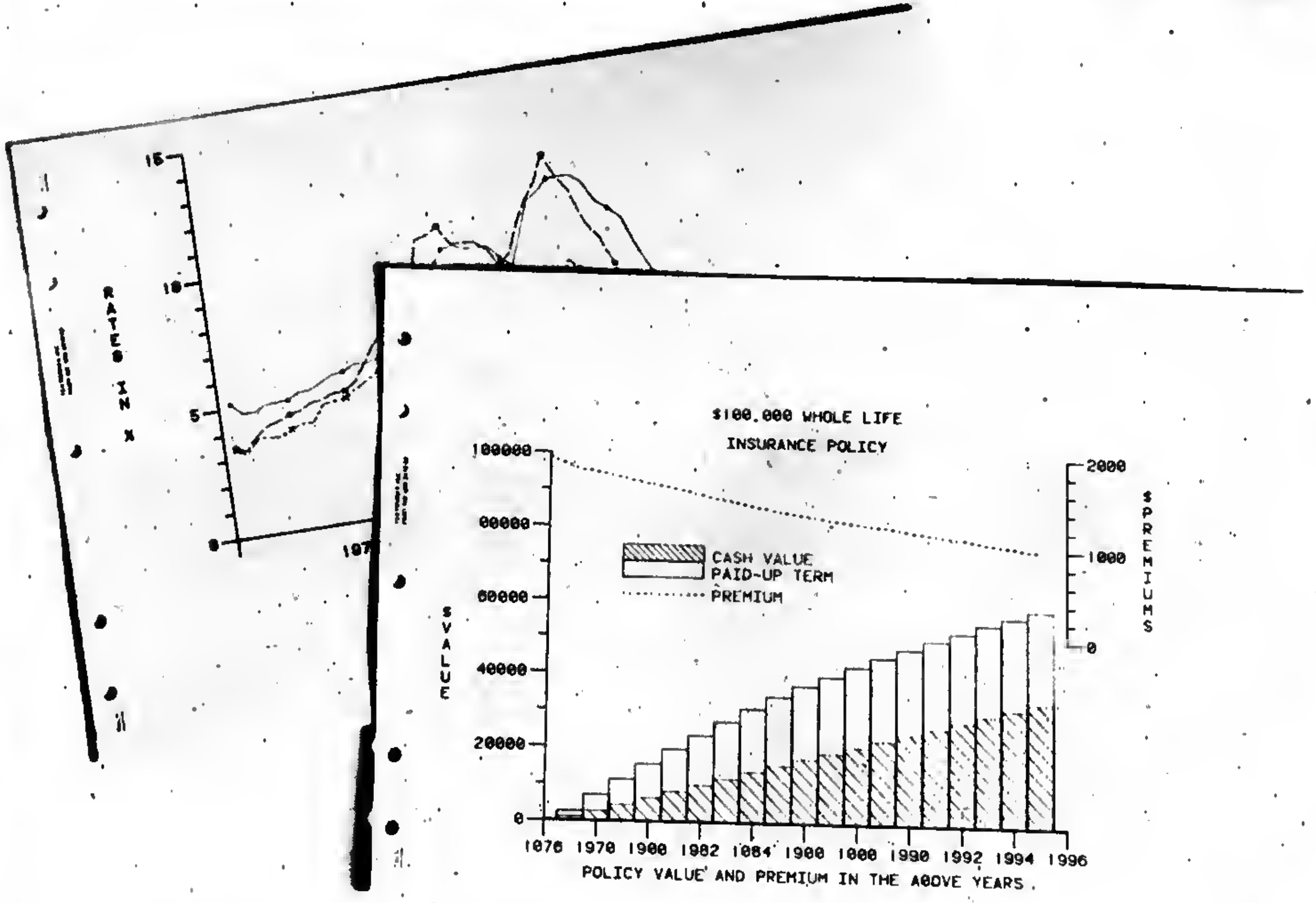

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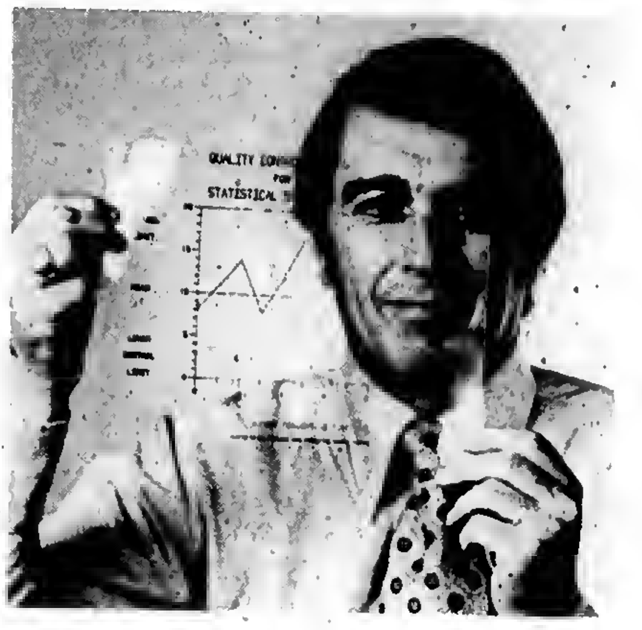
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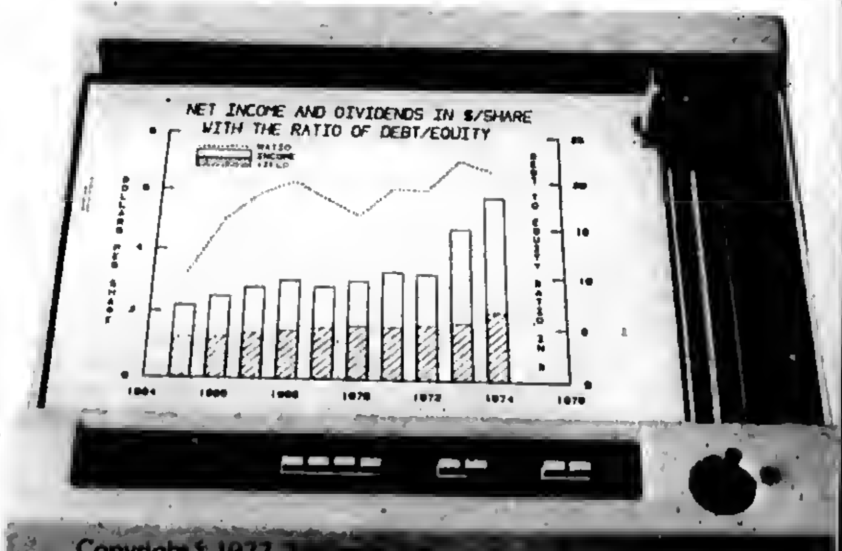
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State DP Service Bureau Creates Secure Facility

(Continued from Page 57)

ficer controlled passage through the booth, which consisted of two locked doors separated by a short passageway.

Simple access control of the computer room entrance sufficed for six months while a number of options were explored among generally accepted systems: key, code, key/code and others.

The key and code systems were rejected for their one obvious flaw: they allow multiple ingress ("tailgating") once the door has been opened by a key carrier. Other systems were rejected as not adaptable to Teale's physical requirements, including the need to coordinate with the lessor's access needs in both buildings on a 24-hour-day basis.

The system chosen and installed offers remote personnel identification and access control, based on a two-zone plan. The computer/data storage area lies within an inner zone, surrounded by a fully secured outer-zone perimeter — a "room within a room" — plus unsecured office space. The inner zone also includes the lessor's computer room, with a separate access point, plus a code-locked door between the two facilities.

The core of the system at Teale Data Center is the control room, located in a protected area within the perimeter, adjacent to the principal computer-room entry-exit point. Heavy glass panels allow visual inspection of the "man-trap" booth leading into the computer room.

Within the control room, which is always locked, one security officer sits at a conrol console that includes three split-screen Videoguard monitor/-control units and 18 additional video monitors. The units are manufactured by Mardix, Inc. of Mountain View, Calif. One split-screen unit controls entry-exit and identification through the outer perimeter; the others control auxiliary entrances into the computer rooms.

Identification control of the man-trap passageway is visual. Two additional split-screen units are used for after-hours control of both building entrances. For emergency use there is a two-way radio and telephone communication link with outside State Police units.

The 18 monitors provide surveillance of the entire perimeter hallway on the "sterile" area principle: Scanning is intended not to obseve personnel movement as such, but to note uncommon items left in the hallways such as briefcases, packages and boxes. Aside from personnel, hallways are requried to be vacant.

Each entry-exit point is an 8 by 8 ft Videoguard booth with two locked, opposed doors and a wall-mounted identification console. Concealed in the console are two CCTV cameras which present full-face and badge views to the split-screen unit in the control room. A third camera in the booth ceiling provides a wide-angle view of the entire booth to ensure occupancy by only one person.

The controller can switch from split-screen face/badge monitoring to full-screen overhead view at his discretion, and may initiate two-way voice communication. Doors can only be unlocked from the control room, and relock automatically on closing.

Cable Transmission

All signal transmission for the electronic surveillance system is by cable which was installed through the building's existing conduits. One cable extends under the street to the access booth at the entrance to the second building.

When Teale went into operation, normal security required one officer per shift at the man-trap entrance to the computer room, plus the outside patrol of building entrances and grounds provided by the lessor. To Teale, this represented a total of five man-years on a 24-hour, seven-day basis.

This system continued through Teale's first six months' tenancy while the remote equipment was selected and installed.

With the Videoguard system one man per shift controls all access to and identification for the building as well as for the computer room. This frees two officers for patrol who would otherwise have to be available to permit entry to the building.

The two officers are then able to complete two additional patrols of the ground and buildings per night. Since both Teale and the lessor share the cost of the system, the net effect has been to reduce the security force by one and double the efficiency of two others, with a net manpower savings of $60,000 per year.

The cost of system hardware and installation amoritzed itself within 18 months, according to Pujals, on savings achieved by using fewer officers. "If we can project a national inflation rate of approximately 5% per year, we'll see even more savings in time," he said.

And there are other, not-so-apparent savings: less casual foot traffic and less need for janitorial service.

According to Pujals, Teale Data Center was the first California State agency to install remote personnnel-identification and access control. Now, two and one-half years later, other state agencies who inspected it have installed 26 remote access units essentially the same as those installed at Teale Data Center.

Yaggi is president of Mardix, Inc.

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Firm Boosts Output With Multimedia System

(Continued from Page 57)

tape (probably the most popular recording medium among CMF's customers), Beyer said. And when the company attaches another communications line to the data entry system in October, CMF will also be able to accommodte IBM-compatible floppy disks for the first time.

This expanded service capabiity has opened previously unavailable markets for CMF and has freed the company from reliance on its sometimes undependable outside contractors, Beyer explained.

CMF began operations six years ago with a small battery of IBM 026 and 029 keypunch machines before upgrading two-and-a-half years later to 35 IBM 129 units. Six months after starting the business, company officials concluded that the IBM equipment, though adequate for the job it had been required to do, had increased their punch-card costs to as much s $2 to $3 per thousand, an unacceptable expense, Beyer recalled.

Company officials also concluded that the IBM machines had unduly tied the firm to punch cards and in so doing, had hampered its competitiveness in the increasingly promising magnetic tape market.

They also complained the keypunch units had limited the company's control over its internal operations. If one of its outside contractors experienced a serious equipment breakdown, for example, CMF could do little to correct the problem except try to explain to an unsympathetic client why the data entry firm would be unable to meet its production deadline.

To alleviate these problems, Beyer and his colleagues decided three years ago to replace their keypunch machines with a more up-to-date and versatile data enty system. In their search, they evaluated equipment from seven hardware vendors, including Inforex, Inc.; Entrex, Inc.; General Computer Systems, Inc.; IBM (which offered a floppy-disk-based system); Lockheed Electronics Co.; Four-Phase Systems, Inc.; and CMC, a Los Angeles-based division of Pertec Computer Corp.

Opted for CMC

CMF eventually opted for the CMC equipment, a Model 5 system with 16 keystations. That configuration in turn gave way two years ago to a more advanced CMC 1800 system that today incorporates 32 Model 108 keystations and leases for $4,600 a month.

Beyer and his associates picked their current data entry system over the other configuration they considered primarily because they were impressed with CMC's service and with the performance of the demonstration models they observed, the company vice-president explained.

Besides the CMC 108 keystations, CMF's data-entry system incorporates a Decision Data Computer Corp. 8010 cardpunch unit, a Centronics Data Computer Corp. 102 printer and a CMC 1116 CRT terminal. Athough the system has no computer, it uses Cobol programs to verify data and RPG-II programs to control inventory, internal billing and invoice preparation.

CMF plans to soon increase the system's array of keystations to 40, Beyer added.

Ampex Expands DEC Memory

EL SEGUNDO, Calif. — Ampex Corp. reports that it has expanded its ARM-10L memory for Digital Equipment Corp. Decsystem 10-KL and KI models to 512K word capacity in a single cabinet.

The 512K-word ARM-10L memory, which is based on 32K by 18-bit modules, is equipped with two- or four-way internal interleaving capabilities. The memory unit requires 7.5 ft of floor space, the firm said.

Earlier the 128K-word and 256K-word versions are field upgradable to the full 512K-word capacity. All three capacities can be equipped with eight ports, in two port increments, a spokesman said.

The system panel provides controls and indicators for power, port priority, port activity status, sector address, sector status, two- or four-way interleave control, address status, data status, parity error status, last module selected, memory hang indicator and hang reset-control, he said.

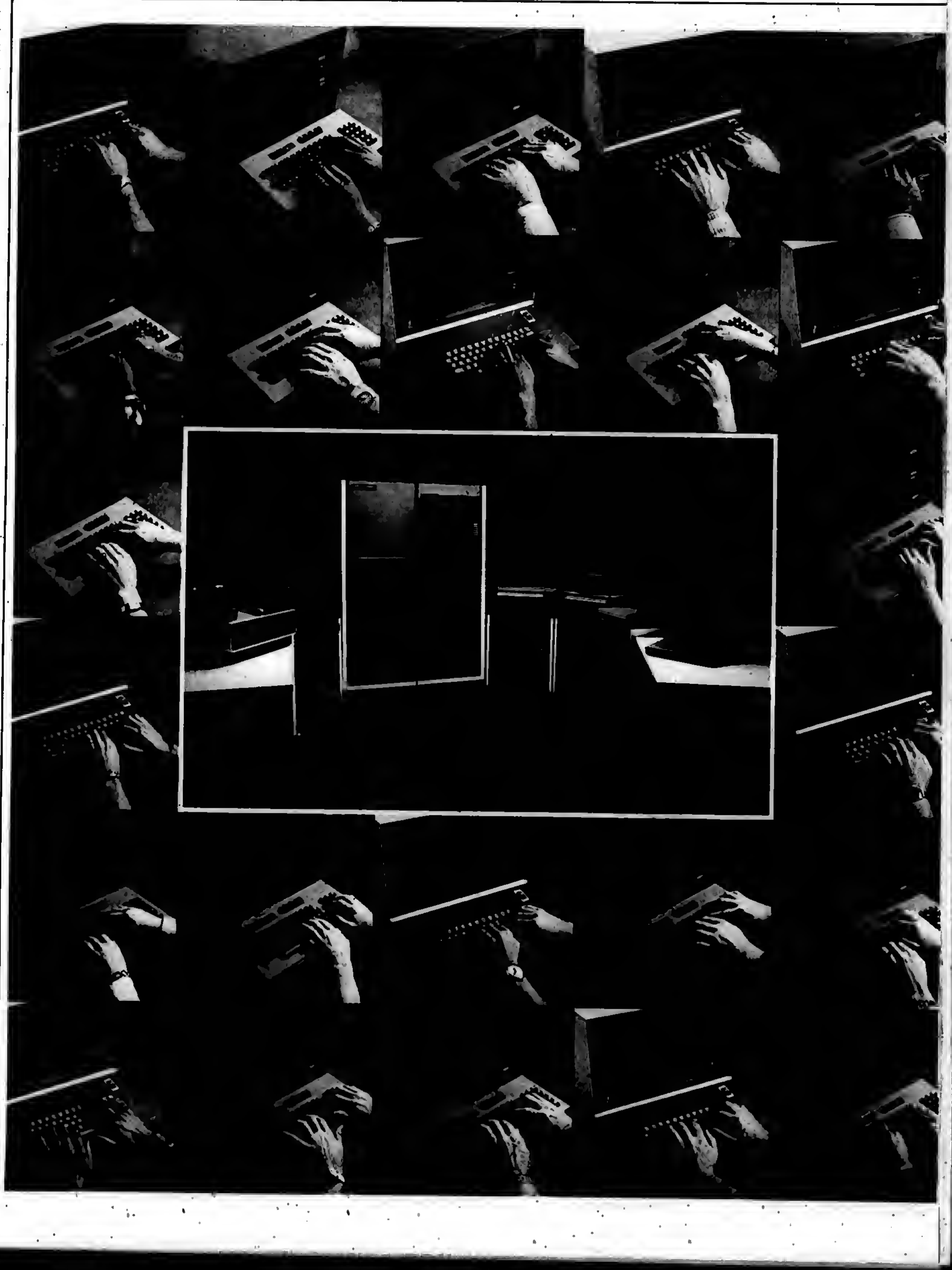
Typical access time is 500 nsec with a maximum of 520 nsec. Cycle time is typically 750 nsec with a 770 nsec maximum, the spokesman claimed. The 512K-word ARM-10L costs $175,000 and delivery is 30 days from the firm at 200 N. Nash St., El Segundo, Calif. 90245.

Magstripe Verifier Displays ABA Data

TORRANCE, Calif. — American Magnetics Corp. has introduced a magstripe verifier for instant reading of encoded American Bankers Association (ABA) data on magnetic stripe cards.

The verififer has a 38-digit LED display. The user simply passes a magnetic strip card through the reader and the encoded data is displayed on the screen, the company said.

The reader costs $1,495, it added from 2424 Carson St., Torrance, Calif. 90501.



Replaces Key-to-Tape

Dow Increases DP Efficiency With RJE System

ELIZABETHTOWN, Ky. — Dow Corning Corp. has increased its data entry productivity with a 25% reduction in keystrokes and one third less verification time since the installation of a key-to-disk remote job entry (RJE) system.

Dow Corning installed a Data 100 Corp. Keybatch system for the plant here in April 1976, replacing a key-to-tape system for batch data entry of financial and administrative data. The plant manufactures a variety of silicone elastomers and adhesives.

The company wanted both better productivity from its key operators and on-line communications with the host CPU, an IBM 370/158 at the corporate site in Midland, Mich., according to Michael Mallicoat, data center supervisor. With the off-line key-to-tape system, data was transmitted from the plant here to an identical system in Midland where it was manually loaded into the mainframe.

"With our limited operator productivity and mechanical problems tht are normally associated with off-line tape handling, we had a very inefficient operation," Mallicoat said.

In searching for a replacement, the Elizabethtown department evaluated the IBM 3270, which is in use at various other company locations. The study showed that even key-to-tape was more efficient than the 3270 for a number of reasons: The 3270 had no programmable keyboard entry, allowed only sight verification and had no off-line storage. In addition, a benchmark study showed total keying and verifying time was 65% more than tape, and accuracy decreased from 99.6% to 98%.

"Since we were already working at nearly full capacity, it was obvious we could not even maintain, much less increase, our productivity with the 3270," Mallicoat said.

After looking at several other alternatives, the company chose the Data 100 Keybatch system. "It provided state-of-the-art in key-to-disk entry, allowing concurrent off-line storage and on-line communications to the mainframe. The programming interface to the mainframe was minimal. The Keybatch easily emulates the IBM 2780 and 3780, all at comparable cost to the key tape," Mallicoat said.

System Configuration

The current system in the Elizabethtown data center consists of a Keybatch control unit, a synchronous communications adapter, a 215 line/-min printer and controller, a line printer adapter, three local key stations and a 2.5M-byte disk drive.

The major data entry applications include accounts payable, production, usage, inventory, shipments, materials requirements planning, purchase orders, accounting formulations and production planning. Since installation of the Keybatch system with its concurrent data entry/RJE capability, other new applications have been installed, including detailed delinquent analyses, production variances, master file for sample orders and work orders.

New software is being developed for warehouse inventory applications and there are currently about 80 application programs on the master file.

Dow Corning uses the RJE capability to key programs onto disk for transmission to the mainframe. Programs submitted in RJE mode include various routines for retrieval, library maintenance and some program development. The number of batches submitted per day in the data entry function is about 20 to 25, with approximately 10 to 15 in the RJE mode.

"The Keybatch system permits up to 999 programs, which can be used concurrently on-line," Mallicoat said. "The same program can be used by several operators at the same time. Program maintenance for data entry supervisors is much simpler than before."

The Keybatch system provides the operators with a larger, more flexible repertoire of data entry functions. When beginning data entry, the operator enters his operator number into the system for tracking operator statistics. He then selects an option — entry, re-entry, verification, search or audit.

The format number is selected by keying a three-digit master format number available from a master format list. The operator then names the batch of data to be entered via an alphanumeric character field. The first four digits of that character field are used for today's date. This enables printout of all batches with corresponding format numbers at the end of the day for transmission purposes.

Production reports are created on the mainframe overnight and sent back to the Keybatch terminal, which is set up in an auto-answer mode and 3780 emulation. The number of output reports has increased to about 35 reports per day, about double the previous output, according to Mallicoat.

The Keybatch system contains many features which have simplified and streamlined the data entry operation. Among these are table look-up, check digit verification and arithmetic computation. A compare and branch feature allows branching forward and

(Continued on Page 64)

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COMMUNICATIONS AND INFORMATION HANDLING

TS System Helps College Students Learn More

(Continued from Page 58)

students to experiment in spacing them.

By merely pressing a directive key, a student can make the space between two letters become narrower or wider. This eliminates the need to hand draw letters and then carefully arrange them to study the effects of spacing..

Another computer-based art lesson allows students to produce on the Plato terminal screen their own designs and then rotate them to any desired degree for observation. One of the major advantages of computer-based design is that students can easily redo a portion of the unit at any stage.

According to one student: "I spent more time redoing what I'd already done just to insert one change. Now I can include new ideas in a few seconds.".

Other principles of design — such as form, line, light, movement, balance and rhythm — are also rapidly available for display on the Plato screen. Students experiment with these elements by adding their own concepts through the keyboard or by touching the materials they want to change or move.

In the home economics department, students are trading the traditional dressmaker form for a computer terminal to determine proper fit of the garments they make in textiles and clothing classes. They are enthused about the new fitting technique as well as about a lesson on how to analyze and correct fitting problems, according to Frances W. Mayhew, a department professor.

"A certain amount of dressmaking for the beginner was trial and error with lots of disappointments and wasted materials," Mayhew said. "Now students are able to simulate design and construction plans on the terminal and they see the results before they cut into material."

As a result of its success with Plato, the home economics department is organizing a national consortium for the development, evaluation and distribution of computer-based home economics lesson materials.

"By sharing efforts and expertise, home economics instructors will be able to expand computer-based instruction into other areas of the curriculum and generally enrich course offerings," Mayhew said.

Highly Organized Support

Central to the university's rapid implementation of computer-based education is a highly organized support and resource program. This was created when just one terminal was installed and consisted of a coordinating committee composed of 17 teachers. Within three months the number of faculty involved had grown to 55, and now more than 100 are engaged in course development.

Each academic area involved with Plato is assigned a programming specialist who helps the faculty members develop courses.

"Our experience with Plato shows it is capable of sustaining the motivation of faculty members. They did not receive released time or incentives of any kind other than the improvement of instruction at the University of Delaware," Hofstetter noted.

Hofstetter believes computer-based education is the next revolution in education and predicted that within 10 years there will be broad-based implementation of it in universities."

"It is inevitable," he said. "There is no stopping it and really no reason to do so."

Chemical Firm Uses RJE To Increase Productivity

(Continued from Page 63)

backward within a format automatically.

The output reformatting feature allows the operator to arrange a format in the order the data appears on the input document without regard to how the computer will handle it. The system automatically rearranges the data into a computer-usable format before transmission.

This, Mallicoat said, is a time-saving feature for the operator. Accumulators enable saving data that has been entered for later reinsertion into a record, thus eliminating operator rekeying.

Activity Log

The activity log feature enables the system to keep track of each supervisory transaction on all batches. If a question arises concerning whether or not a batch has been transmitted, it is a simple matter to check the log.

Accuracy has been improved through features like range checks, which ensure data validity. Data entered must agree with preselected values and range tables or the system will reject the data.

The operator can now selectively verify fields within a record and edit and check the data at the same time it is entered. Previously, it was impossible to verify all records on a key tape in an eight-hour working day, without overtime.

Reduced Keystrokes

The net result has been a significant reduction in keystrokes and verification. Production has increased without the need to add data center personnel. Operator performance is now monitored through the Keybatch statistics feature which keeps track of keystrokes and verification errors.

Reliability, Mallicoat said, has improved considerably over that of the key-to-tape system. As far as vendor support goes, "We get excellent response. The service personnel are really top-notch," he said.

Dow Corning will soon be installing the Keybatch software Version 3.1, which will enable sending data from the communications line directly to disk, he said. It will also implement a feature called Index Sequential Table Retrieval (ISTR) to speed up response time during table look-ups.

The current Keybatch system provides an excellent foundation for expanding into distributed processing with some local processing capability, he concluded.

Recorder Notes Line Noises

ESCONDIDO, Calif.— Micro Instrument Co. has announced a digital power line transient disturbance recorder and analyzer.

The Model 5229 portable sag/surge recorder prints out on an integrated alphanumeric printer all power line disturbances over the entire DC current range, according to the firm.

The instrument is said to operate on-line 100% of the time and will miss no electrical disturbances, giving priority to higher-amplitude transients, regardless of when they occur.

It costs $3,495, a company spokesman noted. from 2250 Micro Place, Escondido, Calif. 92025.

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Publisher Benchmarks Minis for DDP

By Esther Surden
CW Staff

BOSTON — Houghton Mifflin Publishing Co. just completed an in-depth analysis and benchmarking of three minicomputer systems for a distributed data processing (DDP) application.

The system finally chosen outperformed its nearest competitor by nearly a two-to-one margin, according to Jim Burns, corporate director of data services.

The publishing company decided to go the distributed processing route as part of an overhaul of DP activities, Burns explained. Right now the six locations involved have a "mixed bag" of DP capabilities, with three of the branches using key-to-tape equipment and two others using Honeywell Information Systems equipment. The central DP department in Burlington, Mass., has a host IBM 370/148 mainframe.

"The easiest approach that we could see was to take and bite off pieces" of the system, Burns noted. "We decided to go out into the field and update the general user community," bringing them up to an automated state so they can dispense with manual procedures. Streamlining operations in the user locations will hopefully give the end users a competitive edge in the industry, Burns added.

Finding systems capable of performing a distributed processing application was no easy task, Burns noted. "We went to a number of different sources" to determine who had the machines that could do the job. "We came up with 11 potentials," among which was the IBM 3790.

The company sent out its specifications to the 11 prospective manufacturers and they "came back and told us what they could do and could not do." After a technical evaluation of the respondees the DP department the field down to three finalists, according to Burns.

"We told the other eight that we would concentrate our attention on the three that we felt could do the job," he said. Those who fell out were rejected because of limited storage capacities, unavailability of software to support the firm's processing needs or other problems, he added.

The three finalists were Digital Equipment Corp. with its PDP-11/70, Hewlett-Packard Co. with the 300 II and Computer Automation, Inc. with its Syfa system.

(Continued on Page 71)

More Survey Results Show

Users Satisfied With Maintenance

By Esther Surden
CW Staff

NEWTON, Mass. — Minicomputer users responding to a recent CW survey called hardware maintenance of their systems either "good" or "excellent" in a vast majority of cases.

Only 23 of the over 220 users responding to the survey rated their maintenance as poor [CW, Aug. 29].

Those who said hardware maintenance was good, however, did give suggestions as to how it could be improved. As one user said, although "response time is good, the service representatives are not always competent."

Another user noted that the service department his vendor offered was not large enough, while yet another said "although there is rapid response time," he has trouble getting parts.

One Hewlett-Packard user in the U.S. government said the vendor "can usually diagnose and supply a positive fix on the hardware," but "vendor's customer engineers are hardware-oriented, not backed by software support personnel."

Some of Digital Equipment Corp.'s technicians are "rotten" and some are "excellent," another user at a medical center noted, pointing out the problem of spotty hardware maintenance.

'Adequate Talent'

A Burroughs Corp. B1716 user rated his vendor's hardware maintenance as good and said that Burroughs has "adequate talent that sometimes lacks depth and quick response." Another Burroughs user, of a B1705, also called hardware maintenance "good" but said "there was only one customer engineer for too large an area."

"Quality of the repairmen" was "uneven," another user of nine minis from DEC, Interdata, HP and Data General Corp. said, while another user of Burroughs and HP equipment called his service excellent "with average response time two hours and downtime from 2% to 5%."

A user of a Texas Instruments, Inc. TI 960 minicomputer rated TI's maintenance as "fast and effective . . . the thing gets fixed.", A very satisifed Microdata Corp. Reality user called the vendor's hardware maintenance excellent "because of remote diagnostic capabilities" and pointed out that the "system's expandability is almost infinite."

A DG Eclipse and Nova "have given us excellent service for a minimum investment," a municipal DP manager commented. However, the parts inventory kept by the vendor was "insufficient," this user stated.

'Excellent' Rating

Rating the maintenance of an IBM 3/12 as "excellent," one user indicated the yendor features "excellent response, turnaround" and "downtime is almost zero."

In another case, a life insurance company that uses DEC equipment said DEC's hardware service was "poor" because of "slow response.

"They sent too many trainees" and were "low on parts."

A DG840 user at a junior college said his vendor's "engineers are prompt in arrival and their

(Continued on Page 71)

Datapro: User Beware In Buying Small System

DELRAN, N.J. — "The watchword in selecting a small business computer is 'buyer beware,' " Datapro Research Corp. warned readers of its most recent "All About Small Business Computers" report.

"All too often the buyers of this class of equipment have little or no understanding of DP principles and are likely to buy the wares of the salesman who arrives first or sells hardest," the report continued.

"No company should *ever* buy a computer from the first salesman who comes through the door. It's always wiser to check out the offerings of at least a few of the other major suppliers, and you shouldn't hesitate to play one vendor against the other in an effort to get the most for your money," Datapro advised first-time users.

Promises of extra software, technical support and other concessions should be specifically included in the final contract, the report added.

Before considering any system, users should demand detailed specifications for hardware and software from the vendor. A full-scale demonstration of one of the user's principal applications is also helpful, although a demonstration program "whose functions are similar enough to your own needs so that you can draw realistic conclusions about the system's processing speed and ease of programing or operation" will do, the report stated.

The 62-page report features 50 pages of comparison charts covering specification of 249 current systems from 87 vendors. Also included is a chart that summarizes the experience of about 750 respondents with a total of nearly 1,800 minis and small business systems.

The report costs $12 per copy from the company at 1805 Underwood Blvd., Delran, N.J. 08075.

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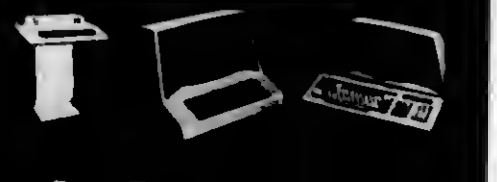

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Magazine Distributors Get System

BALA CYNWYD, Pa. — An in-house DP system designed to meet the needs of magazine, book and newspaper distributors is available from Sonco, Inc.

The system handles allotments, receiving, distribution, invoicing, returns, statements, bulk records and sales analyses, a spokesman noted.

Called MDS,. the system guides the operator through all job steps by continuous prompting and provides for verification of input data and error correction.

The hardware configurations supplied by Sonco consist of Digital Equipment Corp. components. All MDS applications software is written in Dibol and runs under the DEC CTS-300 operating system. Hardware maintenance is available to MDS users from DEC, the company reported.

The basic MDS hardware configuration available from Sonco includes a DEC PDP-11, a two-drive disk subsystem with 7.5M bytes of storage, a Decscope keyboard-CRT display unit and a 180 char./sec printer. Special interfaces to Universal Product Code (UPC) scanners are available, as are 300, 600, 900 and 1,200 line/min printers.

Purchase price for a basic MDS hardware-software system is $54,00. It may also be leased for $1,600 per month, including maintenance, under a five-year term agreement. Delivery is 45 days after receipt of the order, a spokesman noted from Sonco, Inc. at 211 Rock Hill Road, Bala Cynwyd, Pa. 19004.

Sonco MDS System

DeAnza Has Digitizer

SANTA CLARA, Calif. — DeAnza Systems, Inc. has unveiled a video camera digitizer and image storage system that will digitize an RS-170 or RS-343 signal and store it in digital refresh memory for computer analysis and enhancement.

The Model CD5506 can hold an image in a 64-level gray scale with 512 by 512 pixel resolution in one TV frame, according to the firm.

The digitizing system is said to be suited for use with microscopic images, photo analysis and telescopic images. The device will digitize the captured image to 256 gray levels, DeAnza added.

The system is designed to interface to a Digital Equipment Corp. PDP-11 Unibus, although other "popular" minicomputer interfaces are optionally available, the company stated.

Prices for the CD5506 digitizer, not incuding the camera or CRT monitor, start at $15,300, according to DeAnza at 3444 De La Cruz Blvd., Santa Clara, Calif. 95050.

TP-50 Lab System Based on LSI-11

OAK RIDGE, Tenn. — The TP-50 from Tennecomp Systems, Inc. is a laboratory system based on the Digital Equipment Corp. LSI-11.

Designed for use in pulse height analysis, instrument control and general computation, the system has a large display, keyboard and numeric keypad as well as a minifloppy disk drive. A 40-column impact printer is optional.

Users can add any standard LSI-11 or PDP-11-compatible peripherals, the firm claimed.

The unit costs $15,400 for the base configuration from the company at 785 Oak Ridge Tpke., Oak Ridge, Tenn. 37830.

Why do we sign our name with these words?

ltifunction data processin

Gemini Has Turnkey

TONAWANDA, N.Y. — A turnkey minicomputer designed specifically for medium-sized businesses' on-line operations is available from Gemini Data Systems, Inc.

The system is based on Data General Corp. hardware and Automated Quill, Inc. software, a spokesman noted. The standard software incudes a business application utility subroutine library, open-item accounts receivable, inventory control, billing, open-item accounts payable, financial reporting and payroll.

Basic hardware for the system includes a 32K-word Nova, one CRT, 10 million bytes of disk and a matrix printer.

The basic configuration costs $38,250 from the company at 2638 Sheridan Drive, Dept. 378, Tonawanda, N.Y. 14150.

Mini Suits Business, Science

PROVO, Utah — Billings Computer Corp. is offering users a business and scientific minicomputer called the Data-Byte System 1.

The basic system includes a Billings CPU, dual floppy disks, a B-100 terminal and a bidirectional line printer. Operating software and relocatable Fortran IV are included as a standard part of the system, a spokesman said.

Hardware options available for the system include higher speed printers, X-Y plotters, analog-to-digital and digital-to-analog converters, acoustic couplers and application software as well as 50M- to 300M-byte hard disks.

The basic system costs less than $18,000, the spokesman added from Billings Computer Corp., P.O. Box 555, 2000 E. Billings Ave., Provo, Utah 84601.

PDP-11 Board Bows

SANTA ANA, Calif. — Able Computer Technology (ACT) is offering its QuadrAsync/C interface board to Digital Equipment Corp. PDP-11 users.

The unit gives users four asynchronous communications channels but presents only one load to the system's Unibus, a spokesman stated. Called a 20ma current loop alternative to the DL-11C, the unit is software compatible with the DEC PDP-11, according to ACT.

Contained on one quad board with four DEC-compatible connectors, the unit operates in full- or half-duplex mode.

The unit costs $1,600 with quantity discounts available from the firm at 1616 S. Lyon St., Santa Ana, Calif. 92705.

Interdata Users Get Array Device

NEWTON, Mass. — Computer Design and Applications, Inc. has an array signal processor designed for use in Interdata 8/32 and 7/32 minicomputers.

Occupying a single plug-in board, the system is designed for such applications as image enhancement, voice processing and analysis of seismic data, a spokesman said.

The board derives its power from the host computer, the company noted, and is said to be able to perform array calculations from 10 to 50 times faster than minicomputers used for that purpose.

The unit costs $19,500 with quantity discounts available, a spokesman said from 375 Eliot St., Newton, Mass. 02164.

Drafting System For Wang Units

SAN ANTONIO, Texas — The EDP-11/75 flatbed drafting system can now be interfaced to Wang Laboratories 2200 minicomputers, according to the vendor, H. Dell Foster Co.

The microprocessor-controlled stand-alone system offers users a resolution of .001 inch, the firm noted, and is tiltable to 55 degrees. It features a three-position universal drafting head.

The plotter, plotter interface and software driver to convert existing Wang applications programs cost $18,700 without a vacuum hold-down feature and $19,950 for a version with vacuum hold-down. The Wang 2200 interface must be added for $450, a spokesman said from the company at 14703 Jones Maltsberger Road, P.O. Box 32581, San Antonio, Texas 78216.

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NEW Extended TSO Capabilities

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This package is named Video Programming Tools (VIP). VIP offers a broad array of TSO commands and sub-commands providing a generalized on-line update and inquiry system for its user. An associated data dictionary facility is provided to allow users to define specific field definitions for files being accessed. Fixed or variable length records are handled for ISAM, BDAM and sequential datasets. Data, at your option, may be displayed in hex, bit, packed or character format. Multiple formats may be assigned to one field. VIP is also very handy for creating complicated test files for program debugging.

Included in the VIP package is an OS JCL Flow-charter. All JCL including PROCS is flowcharted on 8½ x 11 printed output picturing each job step on a separate page.

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- No extra tape label data

The system runs on an IBM 370 computer under VS2 with TSO and SMF. You may use LIBMAN under a perpetual lease or monthly rental plan.

Conversion Packages

RPG/RPG II To COBOL Translator

This package accepts all types of RPG and produces ANS COBOL. The resulting COBOL program is modular in design (main driver perform sub-routine) and follows the basic RPG process cycle: Read, Process, Write. RPG data and procedure names are used without exception unless they are COBOL received words. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation.

MAP To COBOL Translator

Honeywell MAP source code is the input and IBM ANS COBOL is the output. Originally, MAP was programming language for the earlier General Electric 400 Series Computers now referred to as Honeywell 400 Series Computers. The Translator runs under IBM's OS/VS operating systems and will work on either 360 or 370 hardware. The resulting COBOL procedure division uses section-level code to accommodate the translation of MAP internal sorts having I/O procedures. A common print routine is inserted into each report writing program to convert MAP carriage controls to those supported by IBM. Various warning messages are provided as part of the translator output to highlight potential problem areas within the translated program.

COBOL To COBOL

System—3 COBOL is the input and 360/370 OS ANS COBOL is the output. This package is designed to save your programmers the boredom of changing 5000 select and FD statements the same way every day until your conversion project is done. Also specific differences such as COMP—4 (Binary), missing value clauses, UPSI switches, etc. are handled. Since the System—3 used no printer carriage control character in front of the print line all print commands are replaced with a perform of a common print sub-routine which inserts the correct carriage control for 360/370 printing.

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SIMBA is a blocker/deblocker interface between your applications programs and relative block BDAM datasets. By allowing you to handle relative block BDAM as though it were relative record BDAM you save a considerable amount of disk space for dataset allocation as well as realize an improved program processing efficiency. SIMBA is very valuable when converting from hardware environments where relative record accessing was heavily used to an IBM 360/370 enivronment where BDAM is not oriented toward blocked records. SIMBA will run on any OS/VS IBM 360/370 hardware.

DASDCMP

This is a Generalized File Utility designed to expedite programmer productivity during major conversion projects, parallel testing or regression testing where large data files must be compared to verify new program accuracy. The compare and print function, when a difference is sensed between two files, prints the file one record followed by just the differences for the file two record. Errors are quickly spotted. Control card parameters are accepted so you can compare specific parts of a record or ignore specific differences. Also file merging, match compare and print and print only functions are available. Records are printed in alpha and hex.

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PHONE EXT

Boeing Division Installing Mini-Based Control System

By Robert C. Gamrath
And Fred M. Stewart
Special to CW

SEATTLE — While the Fabrication Division of Boeing Commercial Airplane Co. here can do little about an environment indigenous to a machine shop, it is removing from the floor two major causes of downtime — tape readers and spoolers — and replacing them with a minicomputer-based online distributed numerical control system. By the end of 1979, 80 machine tools are planned to be assimilated into the system.

Presently, our Distributed Numerical Control (DNC) process, developed by Allen-Bradley Co. of Cleveland, Ohio, is operating 25 tools.

Its base is comprised of two Allen-Bradley Bulletin 1795 systems, each incorporating an Interdata 7/32 minicomputer that transmits instructions from a remote location directly to the machine tools. Enclosed in a room above the machine shop floor, the minis are removed from the severe elements and are therefore unaffected by the environment below.

Though our system is still many months away from full implementation, its present phase is far and away superior to past methods. Like most machine shops with numerical control tools, we had — and still have in many instances — photo electric tape readers and electromechanical spoolers on the floor.

Mylar tapes to control the tools were brought to the floor where they were run through readers.

Programs were read in blocks, the tapes starting and stopping after every one to two inches. Thus, in a 500-foot reel of tape operating at 400 char./sec, the reader started and stopped 12,000 times.

Besides such heavy-duty operation, the readers and spoolers were exposed to hydraulic and lubricating oil, coolant, metal chips and a mist that hangs over the shop. All of this contributed to numerous failures and an ongoing program of maintenance.

As conceived in diagram form, our system will resemble a pyramid with part programming computers at the apex servicing two modules that will operate a total of 80 machine tools.

A module consists of two systems. Each Bulletin 1795 is designed to operate 20 machine tools. It may be linked to machine control units, which in turn operate the machine, or machine terminal units connected to machine control units.

When the system is complete, our parts program will rest in a data base library, also resembling a pyramid. At the apex will be an "active" library of stored parts programs, which can be accessed for transmission to a tool-operating terminal.

The "ready" library in the middle is for parts programs scheduled for near-term use, but not currently in demand by a terminal. Speed is less important but still must provide for suitable response.

The "archives" are exactly that — every parts program in our library.

When the system is totally operational, the manufacturing engineering group responsible for developing parts programs would store the data in the archives. The parts programmers will have sole responsibility for management information in the archives.

Programmers will be able to revise the status of programs or purge them from the archives. Using a CRT, a programmer will be able to track a parts program to a particular library level and put an immediate hold on it for change or purge. If the program is already in the "active" stage, we will allow the part to be cut before recalling it.

Gamrath is Director of Facilities and Stewart is manager of Mechanical Equipment Engineering at the Fabrication Division of Boeing Commercial Airplane Co., Seattle, Wash.

Operator mounts punched tape onto system at Boeing Commercial Airplane Co.'s Fabrication Division.

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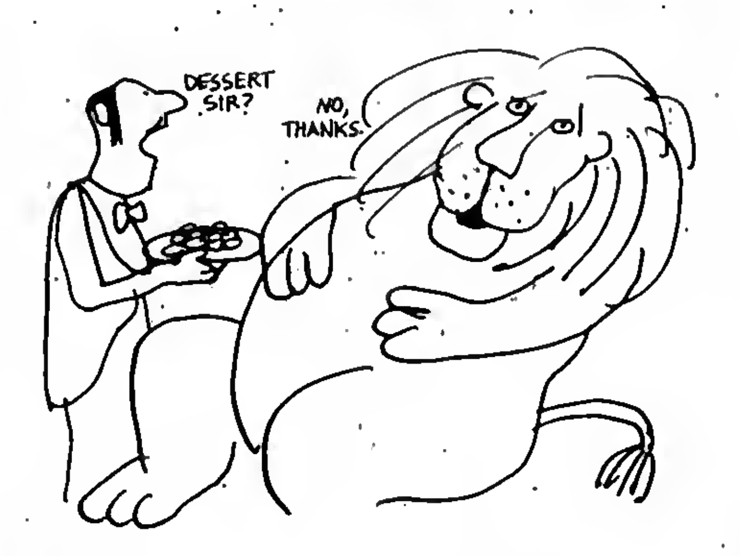

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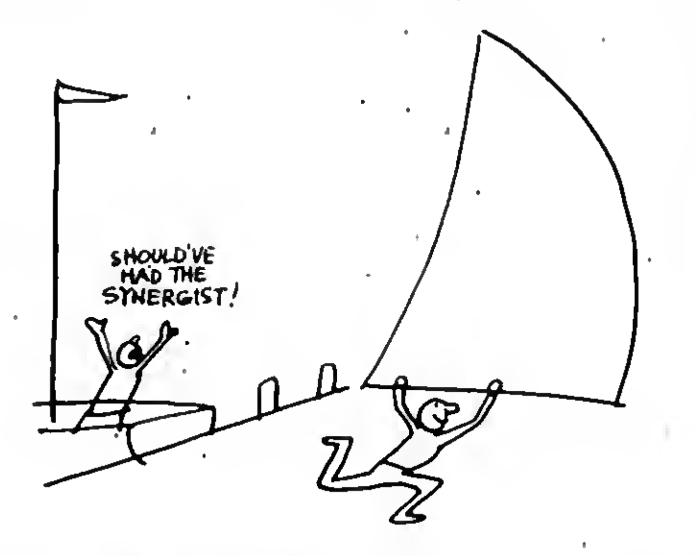

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Schedules Closed Faster

Auto Metal Fabricator Keeps Growth Rolling

AKRON, Ohio — A metal fabricator for the auto industry is keeping its business rolling with the installation of a small business system.

In order to meet production schedules, Falls Stamping and Welding Co. must stock huge inventories of steel and other raw materials. Combined with a weekly payroll of over 150 employees, inventory control became an extremely complicated job.

Records had previously been kept by hand, but the complexity of Falls Stamping's payroll dictated the need for an automated system.

Initially, Falls Stamping contracted with a local service bureau for computer assistance. It didn't work, according to D.A. Stoneman, controller. It took up to four working days for information from the center to reach the company, he said.

The relationship became even more difficult during severe weather conditions. The service bureau failed several times to deliver payroll checks on time and union officials were understandably concerned, he noted.

After switching to a different service bureau, the situation improved. But a similar problem soon developed, forcing the company to prepare payroll checks by hand to avoid a union confrontation; Stoneman said. On one occasion it took two employees one full day to prepare and distribute checks, he added.

"Service bureaus," according to Stoneman, "were charging us $1,800 per month for hourly payroll which was approximately 80% of their work for us. The other 20% was for miscellaneous reports," When it came to nonprogrammed requests, it meant an additional delay due to programming time.

"What we wanted to do," Stoneman said, "was to get away from the problems with service bureaus and have our own small business computer system."

Narrow the Field

After reviewing and evaluating findings in a Datapro computer research report together with competitive product literature, the field was narrowed to 12 computer manufacturers. A letter was sent to each manufacturer requesting a quote on a 16K system, 6M bytes of disk with a printer and CRT.

"We developed our own questionnaire," Stoneman said, "which was sent to each finalist. Based on responses and personal interviews, the Microdata Corp. Reality system was eventually selected.".

The company needed a system that was easy to operate. "All the way from the secretaries to the company president, we needed a computer anyone could communicate with," he said.

The system installed has 16K bytes of memory, 10M bytes of disk, two CRTs and a printer.

Almost immediately after the system was in operation, Falls Stamping began to realize a return on its investment, Stoneman said. The monthly cost for owning the system was about half what the service bureaus had been charging, he added.

One of the most important features was the programmability and retrieval of information in Microdata's English. "It was hard to comprehend how fantastic English really was. Now that we have it, it's remarkable. What a powerful tool it has turned out to be," Stoneman said.

The system handles scheduling, weekly payroll and inventory. It inputs daily invoices and updates receivables simultaneously. Payroll now goes out on schedule without concern over violating union contracts. "There are many other areas where the system can help improve our operations," Stoneman said, "that we never thought of before."

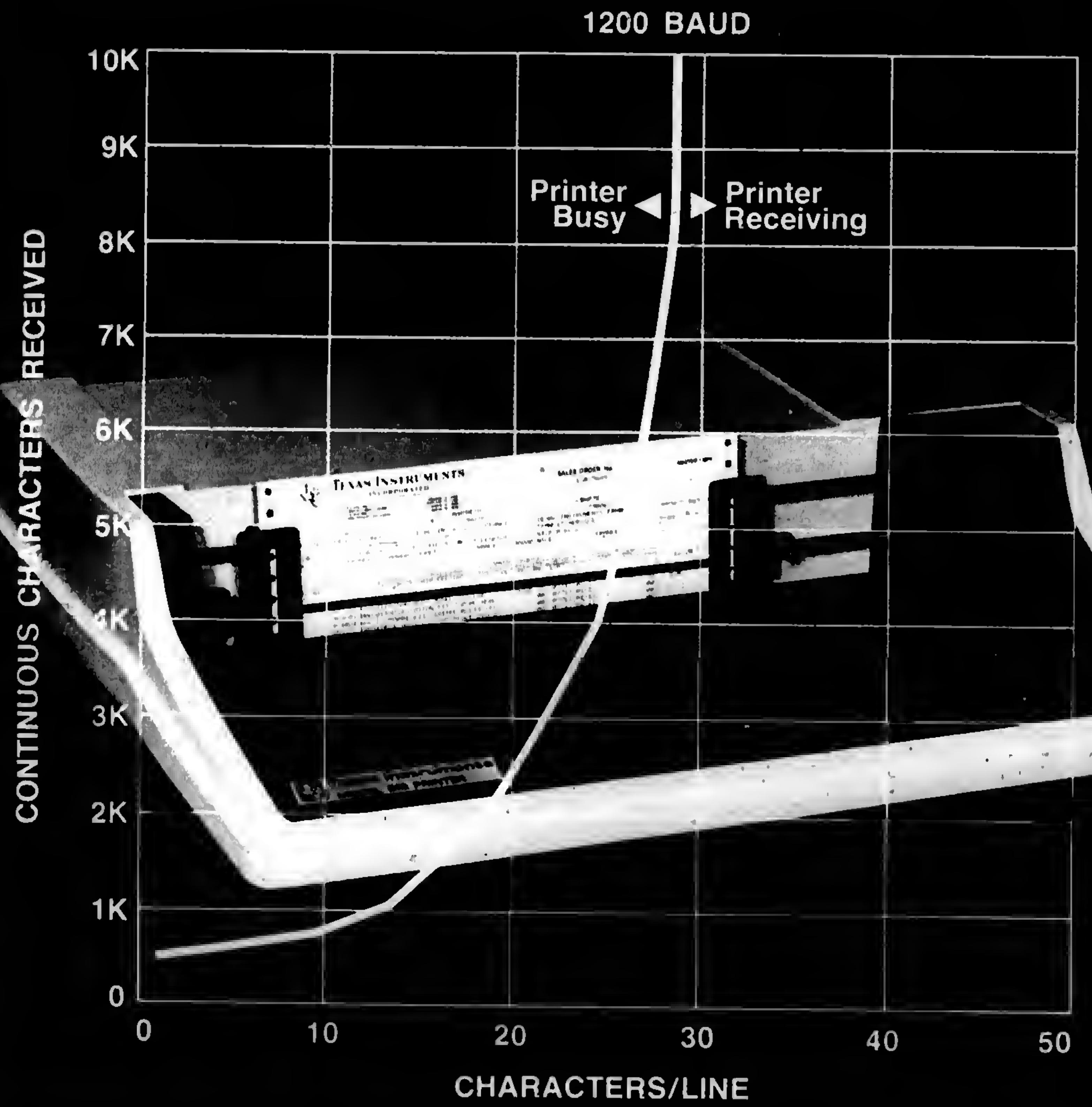
Alternate Jobs

A typical example of how the system has enabled Falls Stamping to react quickly to changing situations was when

(Continued on Page 71)

New from TI.

Plot the performance of the Model 810 Printer against any other printer on the market.



With average line lengths of more than 28 characters, the 810 Printer can accept continuous data at 1200 bits/sec. with no "printer busy" interruptions for carriage return.

Auto Metal Fabricator Keeps Growth Rolling

(Continued from Page 70)

a major auto manufacturer suddenly shut down six plants. The computer immediately provided alternate routings for materials, personnel and press loads. It listed run times for alternate jobs and noted orders that could be scheduled in place of the jobs that were being held. It even told Falls Stamping if sufficient materials were on hand to complete alternate jobs. If not, it notified purchasing to make the buy.

What has the addition of the computer meant to Falls Stamping? Profit, according to Stoneman. Schedules are closed as much as five days faster every month. Jobcosting is more precise than ever before and available in a number of formats. Response to customer demands is faster and more accurate, he said.

On the management side, department heads can have a status report on any job or materials-on-hand by pressing a few buttons on the terminal. Management response time to any problem area is shortened by three days or more, he stated.

"We've more than paid for the system already in increased efficiency," Stoneman said, "and we expect it to have a major positive impact on our profits from now on."

As far as planning and projecting, the mini permits Falls Stamping to plan for the future as well as the present. Cash flow has been improved tremendously through production efficiency, making it possible for meaningful financial planning for the future, he said.

Publisher Plans DDP

(Continued from Page 65)

A test bed of 8,700 typical transactions was created for the benchmark testing, Burns explained. "The transactions would be different going into a CRT against the current method, so we really had to create" the data base, he added:

Among the formalized tests were multi-keyed access; generic search — partial key retrieval; significant word access; and multitasking capabilities. Also included were record updating via key; high-volume throughput and high-speed access to disk; and random, sequential and indexed access on the same file.

The department ran the 8,700 transactions through multiple CRTs and timed the first and last terminals to complete the transactions. "The last CRT to finish up all 8,700 transactions" did so in slightly less than three and a half hours — the Syfa system. The average time was about two and a half hours, he said.

HP was the next closest competitor, with the last CRT run finishing in under six and a half hours and the average CRT time in about five hours.

In DEC's case, "its last CRT didn't wrap up for almost nine and a half hours" and its average time was about six and a half hours.

Although price comparisons of the three systems "didn't carry an enormous amount of weight," the Syfa system was about $100,000 cheaper than the nearest competitor.

The first Syfa system is already installed in the firm's DP department for system development. The largest branch, in Geneva, Ill., will get its mini in April.

Upkeep OK: User Survey

(Continued from Page 65)

repairs."

A user of 34 NCR minicomputers said the maintenance service he received from the manufacturer was excellent, but another NCR user, of a single Century 101 system said the vendor's maintenance was poor "because customer engineer knowledge was lacking."

'One-Day Response'

"One-day response with a maintenance contract and excellent repair parts availability locally" rated HP an excellent mark from a user in Maryland. "Very little downtime; 99% up' said a Four-Phase Systems, Inc. user, rating the system "excellent."

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Mini Speeds Flight Data to Airline Passengers

LOS ANGELES — The nearly 750,000 passengers who pass through the Hughes Airwest Terminal at Los Angeles International Airport each year receive updated information about aircraft arrivals and departures from displays controlled by a minicomputer.

Similar systems are also operating at Hughes Terminals in Las Vegas, San Francisco, Phoenix and Salt Lake City.

The mini is the heart of a new airline Intelligent Flight Information Display system designed and developed by the Systems-West Division of Conrac Corp., Duarte, Calif.

Under the control of a Computer Automation (CA) Naked Mini, the system provides information on arrivals, departures, gates and planes as well as new flights or cancellations. It handles as many as 16 flights simultaneously and displays information on 23-inch television monitors located throughout the terminal.

"Under the old system, information was disseminated by telephone from the operations office to check-in counters and boarding gate personnel, who in turn would update manual flight boards," according to Bud Donohoe, director of ground communications and reservation systems for Hughes Airwest in San Francisco.

"In many instances, though, phone calls weren't made or employees were away from their phone and didn't receive the information," Donohoe noted.

At other times, especially on busy days, changes would come so thick and fast passenger agents had no time to update the boards. "When this happened, the agents would be continually interrupted by questions by passengers," he said.

Flights Updated

Now operations agents update flight information using the computer terminal, which is then used to transmit the data to the display monitors.

"It eliminates the time needed to make phone calls and change manual flight boards and reduces the time employes are distracted from their other duties," Donohoe said.

The system also enables Hughes Aircraft to keep employees up to date on continually changing operations information. "Several internal channels are used to disseminate operations data such as aircraft number, gate assignment, fuel load, passenger transfer and cargo data. This information is displayed on 9-inch monitors located below ticket counters and boarding gate areas, in maintenance areas, in hangars and in management offices," according to Ralph Sellars, station manager for Hughes Airwest in Los Angeles.

In operation since July, the system links large television displays in public arrival and departure areas and 9-inch internal monitors in operations areas with the Naked Mini.

The flight schedule for an entire week is stored in the minicomputer's memory in chronological order of flight activity — along with gates, times and other remarks. Each flight is coded for the days of the week it is scheduled.

Daily Setup

When setting up for the day's operation, the operations agent presses a button on his control-edit terminal and the day's first 16 flights appear on the control monitor screen. If no temporary changes are required, the agent punches another button that causes the minicomputer to separate the arrivals from departures and transmit them to the appropriate public display screens.

"All of the television monitors are activated by signals received from the Naked Mini. The operations agent depresses a button labeled 'roll-up' and the top line of the display rolls off. All other lines roll up and the next flight is pulled from the minicomputer's memory and appears on the screen at the bottom of the line. The agent then depresses the transmit key and 'execute' button and data is transmitted to all public display screens," Donohoe said.

"From data in its memory, the mini even knows when to automatically omit flights that do not operate on particular days," he added. "For example, if a flight departs only on Tuesday and Thursday, the computer brings it up to the screen on these days and no others.

"The entire updating operation takes approximately seven seconds," he noted.

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Money-Saving Packages Gaining Acceptance

By T. Schindler
Special to CW

NEW YORK — Packaged applications software makes good business sense for small businesses because it can save money, it can save a great deal of executive time and it offers the user the possibility of knowing exactly what is being provided.

A custom system design may or may not be complete and may not become reality as specified, so users should have a close look before succumbing to the "not invented here" syndrome.

The rise in acceptance of packaged applications software by the smaller user has resulted from a variety of phenomena.

Hardware price/performance in small systems has advanced rapidly, making the benefits of on-site computer mechanization available to smaller and smaller businesses and other enterprises.

The service bureau, either time-sharing or traditional, of necessity burdened with substantial skilled personnel overhead, has not been able to pass on hardware economies because of an off-setting rise in other costs. The economics of in-house processing have thus improved. Service bureaus like the laundromat and freezer center to the home owner, are less essential since many traditional users can now afford their own systems.

Complexity

At the same time, business complexity, largely due to increasing governmental reporting requirements, has virtually forced mechanization of data gathering and reporting procedures for many businesses.

Improved communication and DP education within the business world, even at very low levels, has made increasingly clear that the end result of an accounting system is virtually the same for every business. Procedures differ, of course, but the emotion attached to "my way" is disappearing, partly because of the need for economies and partly because of rising mobility, which is making the long-term employee cadre less common.

Programming costs were always a major consideration, however, they were a relatively obscure, difficult-to-identify segment of the overall mechanization program. Today, the compounded situation of declining need for in-house technical expertise and the rising direct and indirect costs of systems professionals has cleared the way for much compromise by users.

It is fine to be "different" and require a custom designed and programmed system, but how much is it worth? Is it worth $7,000 to $8,000 per man-year? Perhaps. What about $20,000 to $30,000 per man-year? Perhaps not. At least alternatives are worth considering carefully.

'Used' Packages

Combined hardware/software vendors are also interested in reducing the number of developmental software personnel on board by offering once-developed packages installed by less expensive (and easier to find) field programmers.

As usual, economics, communications, education, technology and government are leading the way toward defined peformance standards. Standards are growing out of common basic requirements and benefitting from the input of users, vendors and consulting professionals.

Experience is undoubtedly improving in terms of general package systems performance as well as user satisfaction.

Early development attempts were, predictably, limited by the exposure of the developer whose know-how tended to be single-sourced and thus not necessarily broadly usable. Also, in-house staff of early user organizations tended toward strong "not invented here" attitudes and, while not necessarily openly hostile toward packages, often did less than the maximum in trying to make the package work.

The idea, however, of packaged applications software was and is both logical and economically smart. Vendors continued to try and improve upon past efforts with some startling results.

Today, the mere thought of specially designing and programming a general accounting system is absurd.

Furthermore, advances in design and programming methods allow for system flexibility permitting, at reasonable cost, a reasonable degree of package "customization." The clever vendor today seems to offer both the economics of standard packages and the "nuance" of custom development.

Caveat Emptor

Nevertheless, in spite of tremendous package improvements in recent years, the potential user must be careful. Here are a few initial items to consider when contemplating purchase of a package.

First consider who the vendor is. While size is not necessarily important it does suggest some past success and stability. Growth based upon nonperformance is exceedingly difficult in the systems business.

The vendor may be a recognized hardware supplier with an important market position and reputation to protect. This is probably the best situation in terms of guaranteed support, although not necessarily a guarantee of getting the best package. Remember, such vendors must work within the boundaries of their proprietary hardware capabilities — a reality which may not be in the best interests of the user.

A software house has primarily its package products to live on, but often suffers from thin capitalization and thus a need to install systems with payment taking priority over package performance and support.

If buying software from another user, the risk can be minimized by checking with other users regarding system suitability and vendor support. Questions to be asked include: Is training adequate? Is user documentation adequate? Have any systems errors been detected and how did the vendor react?

Users also need to know what hardware is offered and from how many different OEM suppliers. How well established is the software house/OEM supplier relationship?

Rapid component shifting can mean incompatibility from one package generation to the next. This can lead to obsolescence and an unforeseen major expense when an upgrade or enhancement is called for in the future.

Take Protective Measures

After thoroughly checking out the package vendor, users can take some other protective measures. For example, be sure that the system features are clearly defined in official documentation and that such documentation is referred to in a contract.

In dealing with a large vendor with a substantial user base, there is not much else the buyer can do.

The small software house with little or no user base must be dealt with differently. Policy is often nonexistent and there is often dire need for cash. If in doubt about the package, design a payment schedule that ensures the vendor's interest in the installation until it is certain there are no basic problems and that all claimed features are indeed included.

Schindler is executive consultant at Advanced Computer Techniques Corp., New York, N.Y.

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Shows Draw Hobbyists, Novices, Press

Boston

By Frank Vaughan
CW Staff

BOSTON — Computermania opened here recently amid massive publicity by the show sponsor that microcomputers have come of age.

But despite claims of 14,111 total attendance, the opening day crowd gave the appearance of falling quite short of the expected overflow crowds predicted by the show sponsors, *Kilobaud* magazine of Peterborough, N.H. The show did, however, draw visitors from most parts of the U.S. It also drew much of the international press corps, with the British Broadcasting Corp. and several Asian publications represented.

The Radio Shack Co. TRS-80 was one of the stars of the show as the under-$600 microcomputer system made its New

(Continued on Page 78)

Music enthusiasts found plenty to play with at PC '77.

Atlantic City

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — For the second straight year, the microcomputing people came to the Shelburne Hotel here for a computing show. Personal Computing '77 (PC '77) despite a competing show in Boston, was termed by most attendees and exhibitors an unparalleled success.

Estimated attendance for the two-day show ranged from lows of 8,000 to a high of 12,000. Exhibitors indicated that few of the show's visitors came "just out of curiosity."

Instead, they were generally people with a knowledge of microcomputing interested in seeing the latest state of the art.

The Heath Co. chose PC '77 to make the first public display of its kits line. At times it was virtually impossible to squeeze past the

(Continued on Page 77)

SFS WALLETSIZE
Trekkies and spaceship landing games gave the Boardwalk the look of a spacewalk.

Atlantic City saw no age barrier for microcomputing enthusiasts as young and old came to look, buy and play.

Exhibit Deceived Businessmen: Monosson

BOSTON — "The devastating deception for a businessman is a surface illusion that he can solve all of his business problems for $595 with a simple little computer . . . but he can't," Adolf G. (Sonny) Monosson, president of American Used Computer Corp., said after several hours of discussions with attendees at the recent Computermania show here.

The discussions caused him to realize that businessmen are being seriously misled by "the rising wave of personal computing," Monosson said.

The typical question the businessman asks is where he can get the $595 computer to do his job. He went around the show floor and didn't see it, Monosson said.

The computers demonstrated at the hobby show produced no printout for the businessman, they had inadequate memory systems for business and there was no software support, which meant the microcomputers couldn't be used in business without substantial software expense, he contended.

What the businessman saw were computers developed for the personal computer user — the technician, Monosson claimed.

Monosson challenged the idea that the microprocessor systems will be the salvation of the small businessman. "Digital Equipment Corp. was one of the first to introduce a microprocessor in its LSI-11 and never heralded it as a savior for anyone. People say that Digital didn't realize what it had, but maybe it did and maybe it realized the peripherals and software are far more expensive than the CPU," he said.

Monosson also claimed to have the only real business computer at the show, the Olivetti P-6060. He noted that it was not in the $400 price range, but priced at $8,950.

Because it was designed for the small businessman, the P-6060 has the capabilities the $400 systems lack, he said.

The small businessman must decide if he wants a $400 to $600 system that may or may not work with software; that he will have to bring in to a shop for repairs; that will not have adequate storage for records; and that either doesn't print or does so too slowly to be of real use, he added.

What users are seeing at microcomputing shows is a collection of technical ideas put together in a hodgepodge manner in their early stages of growth. This is of prime attraction to the technical person who has the capacity of fixing the system himself if it goes down or to the game player who sits at a console all day long and plays Star Trek, 21 or Tic Tac Toe.

These microcomputers have limited memory, which is fine for these limited tasks, Monosson said.

Monosson was upset with the description of microcomputers as "business computers." "It puts us on the defensive," he explained. "Many people would come to us and tell us they were very resentful. They came to the show and they looked for business computers and found nothing under $3,000 to $4,000 with software which could be maintained or supported to do the jobs they had heard could be done for $400, $500 or $600.

(Continued on Page 77)

Canadian Show Rescheduled

TORONTO — The Canadian Computer Show scheduled for the International Center of Commerce here Nov. 8-10 will introduce Canada's first Personal Computing Showplace.

Industrial and Trade Shows of Canada made the decision to stage the event on the same days as the Canadian Computer Show, rather than at a different time as had been planned, according to Robert Gowdy, general manager.

"Our original plan to overlap by only one day was adjusted in light of the fact that another consumer show of a different type was booked for the International Centre on the additional dates we had planned on using. We felt this might create traffic difficulties for our visitors and we have therefore rescheduled the Personal Computing Show to the same dates as the Canadian Computer Show," Gowdy said.

Gowdy stressed that the Canadian Computer Show will remain exclusively a trade show and that the general public will not be admitted to the exhibits. Visitors to the Canadian Computer Show will be admitted free to the Personal Computing Showplace, but the reverse will not be allowed, he explained.

Public admission to the Personal Computing Showplace will cost $5. Gowdy can be contacted through the Industrial and Trade Shows of Canada, 481 University Ave., Toronto, Ont. M5W 1A7, Canada.

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RCA Micro Kit Features OS in 4K Bits of ROM

ATLANTIC CITY, N.J. — An expandable hobbyist microcomputer kit called Cosmac VIP (Video Interface Processor) is available from RCA's Solid State Division. It was shown at PC '77 here.

The VIP is a complete microcomputer, offering an operating system in 4K bits of read-only memory, a spokesman claimed. VIP's output directly interfaces with a CRT or, when used with an FCC-approved modulator, a television receiver. Programs can be generated and then stored in an audio cassette tape recorder for later retrieval and use, he said.

Features 1802 MPU

The heart of the VIP is RCA's CDP1802 microprocessor unit (MPU). The MPU board comes with 2K bytes of random-access memory (RAM) using 4K-bit static RAMs, single-chip graphic video display interface, built-in hexadecimal keyboard, 100 byte/sec audio cassette tape interface and power supply.

The Chip-8 interpretive programming language has 31 instructions in a 2-byte format, the spokesman explained. The 512-byte operating system reportedly simplifies loading programs into RAM via the keyboard, recording RAM contents on cassette tapes and transferring tape-recorded programs into RAM. It also facilitates displaying memory bytes in a hexadecimal format on a CRT, stepping through RAM contents and examining the contents of the MPU registers, the spokesman said.

The VIP is expandable both on the printed circuit (PC) board and through connectors. RAM capacity can be doubled on the card to 4K bytes by adding four 4K-bit devices and can be expanded to a total of 32K bytes by adding further memory capacity through a 44-pin connector socket in the card. Parallel I/O expansion to 19 lines can be achieved on the PC card for use in music synthesizers, relays, printers or Ascii keyboards.

The hobbyist manual contains information on kit assembly, operating procedures, Chip-8 programming techniques, machine language programming, logic description, test programs and troubleshooting guides and system expansion instructions. The manual also includes instructions on using the hexadecimal keyboard.

The VIP is selling for $275 from RCA Cosmac VIP, New Holland Pike, Lancaster, Penn. 17604.

Group Forming in N.J.

ATLANTIC CITY, N.J. — A hobbyist group is forming in the Camden County, N.J., area. The group is open to any computer hobbyist and is not limited to computer owners. Information may be obtained by calling Gene Bomgardner at (609) 541-8296.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Scheduled Micro Shows Stretch Across Nation

Trying to figure out how to schedule vacation time and money to take in a hobby computer show or two can be a trying affair. And it often seens like everyone else knows about the big shows, but the information never passes your way.

As a reader service, *Computerworld* will publish a regular listing of known microcomputer shows. Included in the listing will be the name of the show, date, location and the name and address to contact for further information.

Sept.17-18, Houston — **Houston Personal Computing Faire.** Contact: Foundation for Personal Computing, P.O. Box 22486, Houston, Texas 77027.

Oct. 5-7, Niagara Falls, N.Y. — **Micro-10.** Guideon Frieder, Department of Computer Science, State University of New York, Buffalo, Amherst, N.Y. 14226.

Oct. 7-10, New York — **The Great American Do-It-Yourself Exposition.** Contact: National Expositions Co., Inc., 14 W. 40th St., New York, N.Y. 10018

Oct. 11-12, Laurel, Md. — **Microprocessor Peripherals.** Contact: Applied Physical Laboratory, John Hopkins University, Laurel, Md.

Oct. 27-29, Chicago — **'77 Midwest Personal Computing Show.** Contact: Louise Garcia, Personal Computing Magazine, 401 Louisiana, Suite G, Albuquerque, N.M. 87108.

Oct. 28-30, New York — **Personal Computing Exposition.** Contact: Ralph Ianuzzi, H.A. Bruna & Associates, 78 E. 56th St., New York, N.Y. 10022.

Nov. 8-10, Toronto — **Personal Computing Showplace.** Contact: Derek A. Kidd, Industrial & Trade Shows of Canada, 481 University Ave., Toronto, Ontario M5W 1A7, Canada.

Nov. 28, Gaithersburg, Md. — **Personal Computing.** Contact: National Bureau of Standards, Gaithersburg, Md.

1978 Shows

April 28-30, Long Beach, Calif. — **Percomp '78.** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif.— **National Computer Conference & Computer Festival.** Contact: Steve Miller, Stanford Research Institute, 333 Ravenswood, Menlo Park, Calif. 94025.

July 23-25, Detroit — **Macc Computerfest '78.** Contact: Jim Rarus, Semco, Box 9578 North End Station, Detroit, Mich. 48201.

Aug. 25-27, Atlantic City — **Personal Computing '78.** Contact: John Dilks, Rt. 1, Box 242, Mays Landing, N.J.

PC Held for Second Year

(Continued from Page 75)

Heath booth as the number of its visitors never seemed to let up.

Another exhibitor experiencing a large draw was Radio Shack with its TRS-80 display. The company reported that it sold "a lot" of kits during the two days and is "very pleased" with sales.

The popularity of the two exhibits was partially a result of the excitement generated by the two companies' entry into the microcomputer field.

Another exhibit with overflowing crowds was 2005 AD's exhibit. The people manning the booth were costumed in Star Trek attire and the main attraction in the display was a mockup of the controls for an unnamed type of spacecraft.

Visitors could, after a long wait in line, play a version of "Lander" on the large CRT screen in the mockup. "The people came here looking for a show, so we decided that we would give them one," one of the "Trekkies" explained.

Show organizer John Dilks, who works full-time for the telephone company and gave birth to the idea of the Atlantic City show a little over two years ago, seemed pleased with the show's success. "I was concerned for the success of the show, especially with the conflict in Boston, but the turnout here has been fantastic," Dilks said.

"We've outgrown the Shelburne and next year it will be in the convention center," Dilks added as he went from exhibit to exhibit with a massive blueprint in hand, selling space for next year's show.

Gary Coleman, president of the Midwest Affiliation of Computer Clubs (Macc), was named hobbyist of the year during the show banquet. Coleman, a Euclid, Ohio, resident, was cited for his role as prime organizer of the first and second Macc Computerfests in Cleveland.

All of the exhibits here were related to computing in one way or another. When the doors opened, only two booths were vacant, in stark contrast to the Boston show.

Visitors who attended both shows made note of the difference in exhibitor attendance and Dilks reported receiving several calls from exhibitors in Boston seeking booth space at his show. In fact, it was not unusual to see exhibitors sharing booth space.

The willingness to share booth space, coupled with the general excitement over the show, tended to give the exhibit place almost a carnival-type atmosphere. Despite the crowds and lines which stretched from the Shelburne out onto the boardwalk, few complaints could be heard — other than the occasional attendee lamenting the fact that his budget could not be stretched enough to buy all of the "goodies" on the show floor.

Dealer Hits Boston Show

(Continued from Page 75)

"What this show does is show that the personal computer is still at the level of the individual person, attracting the computer afficionado who wants to play, build and do his own thing — and there is nothing wrong with this, and the prices are becoming lower so that he can have one of these units to play with.

Programming

"This does not mean he can transfer it and use it in his business — not unless he invests a lot more money and does not care about outside support and programming," Monosson said.

"What this show has done is to point out — very, very bluntly — that the low-cost computer for the businessman has not arrived on the scene as yet. And what this show has done, more than anything, has hurt the potential buyer of small business machines who has visited this show [because] he has been disillusioned and misled in one form or another as to the fact that computers are not here for his needs," Monosson charged.

Monosson concluded his remarks with the warning that the businessman looking toward the inexpensive type of system to solve his problems should beware.

West Coast Faires Slated

PALO ALTO, Calif. — The dates for the second and third West Coast Computer Faire have been set.

The second Faire will be held in the San Jose, Calif. Convention Center March 3-5, 1978, which is immediately following the Compcon show in San Francisco. The third Faire is set to take place in the Los Angeles Convention Center on Oct. 27-30, 1978.

In conjunction with the date announcements, Faire officials issued a general call for papers for both shows. The deadline for submissions is Jan. 2 for the second Faire and Aug. 28 for the third Faire.

Prospective authors are urged to contact Faire representatives before those dates to obtain format and topic information.

In a separate announcement, it was noted that the proceedings of the first Faire have been published and are selling for $12 a copy.

Faire proceedings, as well as information on past and future Faires, is available from Computer Faire, Box 1579, Palo Alto, Calif. 94302.

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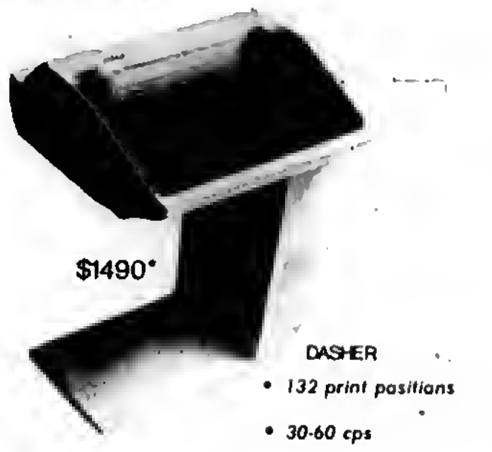

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CRT Expands to 16K Bytes

SUNNYVALE, Calif. — Video Terminal Technology, Inc. (VTT) has introduced its VT-4800 CRT featuring 4K bytes of installed random-access memory (RAM) that can be expanded to 16K bytes, according to a spokesman.

VTT's terminal also offers complete cursor control, cursor addressing by either keyboard or software, scroll up and down, five clearing functions, page increment and decrement, video inversion on any character, RS-232 serial I/O, user-strappable I/O codes and both composite and separate video outputs, according to the spokesman.

The VT-4800 printed circuit board, assembled and tested, costs $650. A kit version of the CRT sells for $1,195 and the assembled version costs $1,295 from the firm at P.O. Box 60485, Sunnyvale, Calif. 94088.

Exhibits Vacant in Boston

(Continued from Page 75)

England debut. Much of the show's local media blitz was based upon the Radio Shack entry, so the long lines at the triple booth surprised few of the visitors, who often had to squeeze past radio and television crews recording the action.

When the doors opened at 1 p.m., almost 40 booths were vacant with no indication as to the whereabouts of the vendors. One-fourth of these exhibitors arrived later in the day; by late afternoon the number of empty booths dropped to 30. Among the noticeably missing exhibitors listed on the program were IBM, Wang, 3M Co. and Texas Instruments.

The hobbyist entering the show floor with a thick wallet and a microcomputing shopping list could easily find almost every conceivable product. Chips, boards, tools, components, kits, interfaces and books stretched aisle to aisle. The person with money to spend could easily walk in empty handed and walk out with everything needed to build, operate and program the microcomputer of his choice.

The user could even be enlisted in the military — the Air Force, Army and Coast Guard manned recruiting booths. The Army even boasted a direct telephone connection to the largest job data bank in the world. The lines weren't too long at the recruiting booths, however.

The microcomputer hobbyist was not in the direct spotlight of the show. Instead, the small businessman with little or no computer knowledge was one of the prime targets. Many of the computer stores displayed systems that aimed at the small businessman — rather than Star Trek, backgammon and chess, accounts receivable, payroll and inventory programs seemed to be on most of the CRTs that adorned the hall.

Other significant exhibits included Imsai Manufacturing Corp., with a booth that dominated the show entranceway. The kit manufacturer displayed its line of micros and peripherals, including its 8085-based systems.

The Computer Warehouse had a large display which, in addition to retail hardware offerings, had artist Tom Huston showing his line of computer art, stationery, jewelery and T-shirts.

Seals Electronics, Inc. showed its line of custom and assembled boards. Jade Electronics had the largest components display, with a retail booth surrounded by uncountable packets of tiny parts and stacks of technical books. A Jade representative noted that many of the visitors had been at the Jade booth in other cities.

Some products that made their way onto the show floor seemed strangely out of place. These included digital automobile clocks with LED readout, police radar detectors and digital clocks.

And, of course, there was the inevitable microprocessor playing music from a great movie out of the past.

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Reflections On the Report Of the Privacy Commission

By Arthur A. Bushkin

At 9:15 a.m. on Tuesday, July 12, 1977, the members and staff of the Privacy Protection Study Commission met with President Carter in the Cabinet room of the White House to present him with the commission's final report, "Personal Privacy in an Information Society." Sitting there, listening to the President express his gratitude for our work and his commitment to these issues — he said that he would personally disseminate and discuss the summary of our report at the next Cabinet meeting — I was struck by the thought of how far we have come.

Just a decade ago a group of computer scientists, in response to the growing concern that all uses of computers could not be predicted or controlled, let alone deemed desirable, formed the Defense Science Board (DSB) Task Force on Computer Security. The group was headed by Dr. Willis Ware, who was later to become chairman of the Health, Education and Welfare (HEW) Secretary's Advisory Committee on Automated Personal Data Systems and then vice-chairman of the Privacy Protection Study Commission.

As a 24-year old graduate student, I became the secretary of the DSB Task Force, having "volunteered," as the junior member of the group, to keep the minutes. Now, 10 short years later, we were meeting with the President of the United States. To borrow a phrase, "we've come a long way, baby."

In 1967, two principal groups were concerned with the impact of computers on society: social and political scientists without a technical orientation and computer scientists and technologists. The proposal for a National Data Center had just been defeated in the public forum of the Congress, and this was one of the first significant examples of a formal public policy debate regarding the effects of computing on individuals.

Computer scientists who followed this issue were motivated, perhaps a bit unknowingly, by two main themes.

First, there was the realization that, without adequate safeguards, "wrong things" could happen to, or as a consequence of, the use of computers.

Second, and probably more important, the issue of a national policy on the use of personal information was only delayed, not resolved, as a result of the withdrawal of the National Data Center proposal. In a piece of little-noticed testimony, Dr. Paul Baran told a congressional committee that, in the future, there would be networks of interconnected computers. As more and more data bases of consequence were automated, the effect of such networks would be the same as a national data center, although there would be no centralized form of control.

In short, as any computer scientist knew, future technological developments were certain to raise the same issues again. It was just a matter of time.

Admittedly, our perception of the problem in the late 1960s was somewhat limited. The "undesirable social consequences of computing" was too vague a subject area to address, whereas "misuse of computers by technologically sophisticated penetrators" was not only possible, it was also an area of immediate concern and funding, and hence, subject to investigation.

Thus, for the next five years, the field of computer security focused on the detection and prevention of the misuse of computers by individuals who were presumed to be as technically sophisticated as the computer security specialists themselves.

By the early 1970s, however, the intellectual boundaries of the computer security field began to expand. The technologically unsophisticated, but dishonest, user of the computer system came to be perceived as a threat at least as serious as the technologically sophisticated penetrator.

While the latter might still be tempted to crack systems in order to steal national defense secrets, tales of accountants, clerks, bank tellers and managers misusing computers for their own personal gain began to abound. The field of computer security now had a cousin: computer abuse.

The release of the HEW Advisory Committee report in 1973 also firmly planted the seed of another idea, namely, that there were right and wrong ways to use computers, even when there was no thought or indication of premeditated abuse or misuse. The Code of Fair Information Practice which was presented in that report not only received widespread attention but, a year later, became the intellectual underpinning of the Privacy Act of 1974.

The field of privacy, or personal information policy, was officially born and, fittingly, the Privacy Act also established a federal commission to study the problem. Now, with the report of the Privacy Protection Study Commission being made public — there are still several appendices yet to be released — it is important to take stock, not only of where we have been but also of where we are going.

Use of computers through the 1960s was mainly confined to the automation of previously manual recordkeeping practices. By the mid-1970s, however, the broad availability and low cost of computer and telecommunications technologies provided both the impetus and the means to perform new recordkeeping functions. Indeed, countless recordkeeping practices have arisen that would not have been possible without computers and telecommunications.

The problem is, however, that *information policy has not kept pace with information technology*. Questions of the impact of computers on society have hardly been raised, let alone adequately debated and resolved.

Whenever topics like technology and society or the social responsibility of scientists arise, however, the mind usually leaps to images of graduate seminars or conference panels; one does not generally think of these areas as the grist for daily endeavor. Likewise, the government regulation of scientific development — as, for example, in the areas of nuclear engineering or genetic research — is not something generally associated with the computer field, except perhaps in the area of telecommunications.

Unfortunately, the Privacy Commission's experience documents the extent to which consideration of the social impact is a missing ingredient in information system development.

The issue of accurate information is perhaps the best example of an area in which information system design and development and their subsequent impact on people have not always meshed as well as they could or should have. Ever since I could first program a computer, friends and acquaintances would regale me with stories of "computer errors" — incorrect bills and the like. I would patiently point out that the computer only did what it was told — after all, what else was there to say?

(Continued on Page 80)

In Depth: Privacy

The Privacy Commission Meets

(Continued from Page 79)

Unfortunately, the "information explosion" of the past few decades, coupled with the dramatic developments in computer and telecommunications technology, has brought us to the point where recorded information now commonly substitutes for direct contact between individuals and organizations. And whereas erroneous information used to be a mild inconvenience, it is now becoming an increasing source of unfairness to individuals.

Throughout the commission's recommendations, there are a number of recurrent themes regarding accuracy, some of which are (1) that individuals should have a right to see and obtain a copy of a record maintained about them; (2) that individuals should have a right to correct or amend a record about them, including the right to file a statement of explanation or disagreement; and (3) that recordkeeping organizations should bear an affirmative responsibility to transmit corrections of erroneous information, regardless of whether the correction was initiated by the organization or the individual, to both sources and prior recipients of that erroneous information.

While the commission recommended varying methods and degrees of implementation of these concepts, the basic thrust remained constant: that the designers and managers of information systems have a responsibility to ensure the recorded information does not itself become a source of unfairness to the individual, and that the individual has a right to participate in the recordkeeping process.

And who could disagree? No one favors unfairness; no one supports the maintenance of inaccurate information. Indeed, one would expect that information systems are already designed with fairness and accuracy in mind.

Yet organizations frequently make no provisions for verifying the accuracy of the data they maintain, particularly when that data has been obtained from another organization rather than from the subject of the record. Instead, there is often a general presumption of accuracy, timeliness and completeness with respect to the information in the record.

Similarly, organizations rarely transmit corrections (which they discover) of erroneous information back to the sources and forward to the prior recipients of that information. Partially as a result, the commission's recommendations contain a number of affirmative requirements in this regard.

Missing the Point

An equally important issue, though, is that of redress of grievances, of due process with respect to information systems and recordkeeping organizations. An aggrieved individual must have some means for righting the wrongs that have happened to him, not just as a result of inaccurate information but as a consequence of any aspect of the recordkeeping process. Interestingly, the issue of computer security will not only serve as an illustrative example, but it will also demonstrate how far public policy in this whole area has come.

The commission found that the federal agency response to the Privacy Act's provision requiring adequate safeguards for personal information ranged from no response at all to, in the case of some automated systems, "technological overkill." At computer conferences this is also probably the most cited provision of the act, usually in some context that implies that, with passage of the Privacy Act, safeguards or security are now mandated.

Curiously enough, this interpretation misses the essential point of the Privacy Act's safeguard provision.

Without delving deeply into the legislative history of the Act, it still can be confidently asserted that the safeguard provision of the act was not intended to mandate a change from an agency's existing practice, simply because there is a presumption that most agencies are already employing adequate safeguards. Rather, the provision provides the foundation for a "cause of action" — the legal term for the basis upon which a suit is brought — for an aggrieved individual in those cases in which he believes that agency practices are not adequate or have caused him some harm or injury.

In other words, the safeguard provision (particularly as it would be technically amended by the commission's recommendations) is premised upon the assumption that most agencies are already using good information management practices. What is new, though, is that an individual now has a basis upon which to bring suit against the federal government — the government consents to be sued by waiving sovereign immunity — if he

(Continued on Page 82)

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In Depth: Privacy

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believes that an agency is not implementing the provision properly.

Thus, the impact of the safeguard provision, which most computer scientists instinctively view as a technical provision, is actually predominantly in the legal domain, in the sense that it is not intended to impose new practices on an agency.

But it is the more mundane provisions, like the one that requires an agency to propagate corrections of erroneous information, that are intended to levy new requirements on recordkeeping organizations. It is precisely these provisions, which have profound technical implications, that are most often ignored by computer scientists. Little attention has been paid, for example, to the requirements for descriptor and routing data in data base management systems.

There is an interesting circle here. The initial response of the computer community to the social issues of computing was in the area of computer security, and the response was largely technical. Now, however, there is a safeguard provision in the Privacy Act with essentially legal implications.

On the other hand, the simple process of collecting, maintaining, and disseminating accurate information has not been adequately implemented over the past decade, with the result that we are now seeing laws (as well as commission recommendations) that essentially tell the recordkeepers, and the computer scientists, to do a better job.

Privacy may be a social issue, but its most significant technical implication will be, in my judgment, not in the area of safeguards or security, but in the simple requirement to develop systems, techniques and procedures for keeping information about people accurate, timely and complete.

No Retreat

My own sense of the situation is that we are now at a turning point. Both public policymakers and computer scientists will have an important responsibility in the next few years, and to ignore this responsibility would be to turn our backs on the "fallout" from the information explosion.

Policymakers will have to grapple with the subtle and illusive issues of information policy. As the commission rightly observes, we live, inescapably, in an "information society." Few of us have the option of avoiding relationships with recordkeeping organizations. Each of us acts out the events and transitions of our lives with organizations as attentive partners, and each of our countless interactions with these organizations leaves its trail in the records they maintain about us.

There is no turning back, no retreat, from the information society that we have become. We must address the issues of information policy candidly, fairly and quickly.

Public policy is, however, an inherently general statement of a social goal. Legislation, as a reflection of public policy, is also inherently general in nature. In its suggestions for revising the Privacy Act of 1974, for example, the commission concentrated specifically on policy objectives rather than on the particulars of implementation.

The commission's goal in this regard was simple: to allow for changing information technology and diversity of organizational information needs and uses, as well as to foster the constructive creativity that is frequently inhibited by overly restrictive requirements.

But computer scientists, system designers and technologists are accustomed to dealing with precise specifications, with functional requirements, and not with generalities. It will be their responsibility, however, to translate these broad statements of public policy into the details necessary for information system design and development. No one else will; or should, do it for them.

It is my hope that technologists and computer scientists will view this responsibility as a challenge. I find it somewhat disconcerting that so few computer scientists are familiar with the HEW Code of Fair Information Practice and that so many speeches are still being given equating privacy with security while no mention is made of the data base management aspects of privacy.

The impact of computer technology on society is no longer some vague abstraction suited only for the classroom or the conference; it is now part and parcel of our daily lives, and my sense is that the computer community is up to the challenge.

Arthur A. Bushkin has been in the computer field since 1962 specializing in protection of data, privacy and information policy.

He was staff technical advisor for the Privacy Protection Study Commission, where he was manager of the Privacy Act Assessment Project as well as manager of the Technology Assessment Project.

He is also co-author of The Privacy Act of 1974: A Reference Manual for Compliance, *published by Systems Development Corp. (SDC). While at SDC Bushkin was one of several senior technical staff members on a computer security contract for the Department of Defense's Worldwide Military Command and Control System.*

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The Waves of Change

By Charles P. Lecht

Users are not the only ones confused by the current proliferation of microcomputers and minicomputers — manufacturers are, too. "The degrees, dimensions and deployment of systems distribution are the key confusion factors," Lecht contends in the latest excerpt from his soon-to-be-published book.

CHAPTER IX

In Chapter I, we noted that today's waves of technological change have obscured our earlier, well-packaged, nicely defined concept of a computer system. Thus it should come as no surprise that there are no universally accepted definitions of the terms "microcomputer" and "minicomputer."

Therefore, it would be well to preface our discussion of the impact of such devices by establishing some working definitions which, while they may not satisfy all readers, can at least serve to indicate "boundaries" for each of these product classes. These boundaries, like so many others struggling to maintain their integrity in today's fluid DP environment, will certainly change by the end of this decade — caveat lector.

- *Microcomputer* — includes one or more microprocessors which perform logical and arithmetic functions under program control (firmware and/or software), and usually consists of one or more LSI (≥ 100 active gates) chips; also included is some read-only memory (ROM) and/or random-access memory (RAM). Today, many microcomputers are limited to 65K or less words of 4-, 8-, 12- or 16-bit size. They provide some I/O interface logic and a limited complement of I/O devices.

"Typical" prices for microcomputer chip sets *without* I/O devices or power supplies range from under $100 to over $1,000 each, depending on functional capability and memory size characteristics. Examples include the widely accepted Intel 8080 chip, the Texas Instruments TMS 1000 and the Motorola 2901.

- *Minicomputer* — includes a miniprocessor (and may, in addition, incorporate one or more microprocessors). It performs logical, arithmetic and I/O functions under program control at speeds typically five to 10 times faster than microprocessors. The mini memory address range is usually wider than found in microprocessors, with sizes extending from 65K to over 262K words.

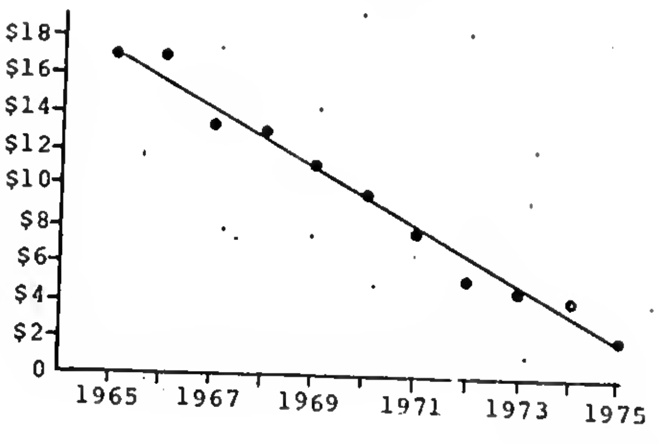
The minicomputer price range varies considerably, depending on features included. From a low-end figure of about $10,000, the cost may rise to something considerably in excess of $100,000 for the processor with some ROM/RAM storage and I/O interfaces (but excluding I/O subsystems). In general, the mini price will be under $50,000.

Model Designation:	8	8/S	8/I	8/L	8/E	8/F	8/A
First Delivery	5/65	9/65	3/68	9/68	3/71	11/72	10/75
Min. CPU Price ($ Thous.)	18.0	10.0	13.5	10.0	5.0	4.0	2.5
Cycle Time (Microseconds)	1.5	1.5	1.5	1.6	1.2	1.2	1.2
Total Installed (July 1974)	2,350		6,900		14,950		-

Figure IX-1. DEC PDP-8 PRODUCT HISTORY (12-bit word)

Figure IX-2. AVERAGE YEARLY PRICE POP-8 WITH 4K MEMORY

(In Thousands)



SOURCE: Bache, Halsey, Stuart, Inc.

The performance ranges of some minicomputers can overlap those normally thought of as falling in the domain of "large" mainframes, such as the IBM 370/158. In this context, "mini" and "large" assume additional meaning as qualifiers, since the former may match the capabilities of the latter — at much lower prices (in terms of raw Mips [millions of instructions per second] — a somewhat controversial measure).

The market for minicomputers (and microcomputers/microprocessors) has been highly price-elastic. Rapid shipment growth over the past decade has been spurred by an average price decline of 22% since the Digital Equipment Corp. PDP-8 was first shipped in 1965 (Figure IX-1). Technological innovations have enabled minicomputer and microcomputer designers to make processing power cheaper, penetrating markets highly sensitive to price/performance.

By designing more power and functional capability into their units while maintaining price levels characteristic of those belonging to preceding generations, DEC, Data General, Interdata and other minicomputer vendors have been able to penetrate markets for more advanced applications.

Major new micro/minicomputer products have been introduced at (more or less) 15-month intervals over the past few years. Average processor and memory prices for these products have declined at about a 20% (or greater) annual rate. However, processor and memory cost constitutes an ever-*decreasing* part of the total computer systems cost while micro/mini peripherals and software/services costs represent an ever-*increasing* portion of the total cost pie.

For example, the software (utilities, compilers, applications, et al) required by the typical buyer of today's $50,000 minicomputer can involve large multiples of the basic hardware price. In addition, the trend toward more complex systems has nearly offset the price declines of low-end systems, flattening the declining trend in average unit prices (see Figure IX-2).

The fact that market expansion has continued despite the trend toward average unit price stablization suggests the importance of functional elasticity as an additional factor in the demand equation.

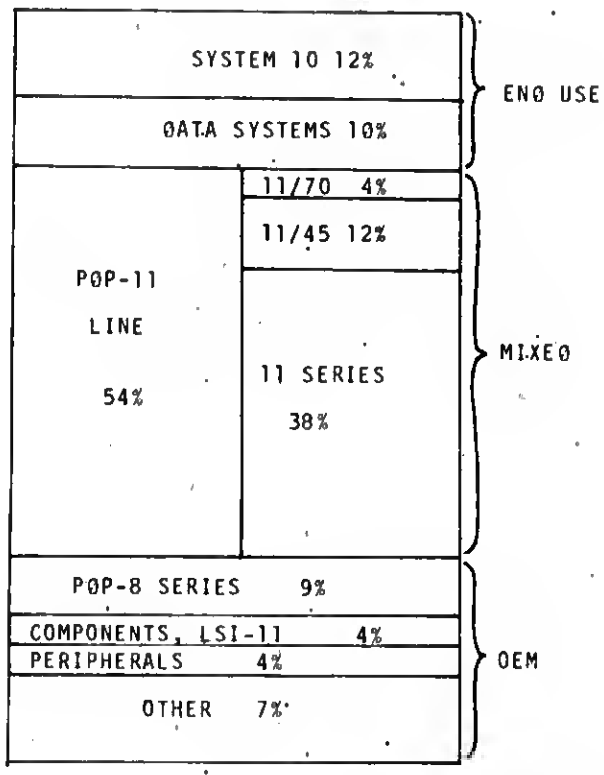
Rapid expansion has also resulted in market fragmentation, with each emerging segment characterized by its own set of multidimensional criteria (industry, function, customer sophistication, etc.). We use the word "characterized" more in the hypothetical than in the practical sense, since a well-defined industrial and/or functional marketplace segmentation which provides a clear basis for product definition continues to elude product planners.

Minicomputer companies have developed families of general-purpose processors which were originally targeted for process control-like ap-

(Continued on Page 84)

In Depth: The Waves of Change

Figure IX-3. ESTIMATED BREAKOUT OF DEC 1976 SHIPMENTS (Total $574 Million)



SOURCE: Bache, Halsey, Stuart, Inc.

Figure IX-4. ESTIMATED MINICOMPUTER (AND MICROCOMPUTER) COSTS PER SYSTEM

	Unit Shipments	Value ($ Mil.)	Value/ Unit	% Decline
1967	2,750	$ 220	80.1	
1968	4,600	272	59.1	26
1969	8,100	355	43.8	26
1970	11,100	415	37.4	15
1971	13,500	377	27.9	25
1972	22,600	500	22.1	21
1973	33,900	770	22.7	3
1974	50,000	1,085	21.7	4
1975	71,000	1,430	20.1	7
1976	96,000	1,820	19.0	5

Source: International Data Corp.

	PDP 11/25 OEM Configuration		PDP 11/40 Batch Configuration		PDP/40 4 User Timesharing		PDP 11/45 Large Scale System	
	$	%	$	%	$	%	$	%
CPU & Minimum Memory	$6,495	50%	$12,995	28%	$12,995	21%	$23,900	12%
Features	320	2	590	1	590	1	5,830	3
Memory	-		5,200	11	12,580	21	63,800	31
Magnetic Storage Media	2,990	23	19,700	42	21,845	36	76,025	37
Terminals	3,225	25	3,225	7	12,900	21	3,225	2
Card I/O	-	-	4,960	10	-	-	2,400	1
Printer							30,000	15
Total Peripherals	6,215	48	27,795	60	34,745	57	111,650	54
Total System	$13,030	100%	$46,570	100%	$60,910	100%	$205,180	100%

FIGURE IX-5. COSTS ASSOCIATED WITH VARIOUS PDP-11 CONFIGURATIONS

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plications. Moving these into the business arena to do payroll, accounts receivable, etc., hasn't been an easy task. Their entry, at the very onset, represented a horizontal, shotgun approach to the marketplace.

The readiness of end users in the early 1970s to purchase mini/-microprocessors is more properly traceable to the economic conditions prevailing at the time (conditions that persuaded end users to "make do" with lower priced, "cheapie" processors) than it is to the perceived sufficiency of those processors to meet more exacting user needs, already provided for by better accoutred, "classic" products.

As time passed, the market/product mappings improved, causing mini/-microprocessors to account for a larger share of the business systems marketplace. Furthermore, the shotgun has now been replaced by the rifle, allowing for vertical penetration increases (Figure IX-3).

Vertical Integration

Partly as a consequence of the trends mentioned above, some of the major mini vendors have launched integration of the manufacture of their own peripherals, terminals, memories and other electronics at a pace well ahead of their competitors. The principal advantages to be gained by this approach include the following:

- Increasing complexity of system configurations (mentioned earlier) means that a greater share of overall system value is represented by peripherals, memory and software (Figure IX-4). In Figure IX-5, note the lower share of system value represented by the Digital Equipment Corp. CPU in the increasingly popular higher value systems (PDP-11/40 and 11/45) vs. the traditional PDP-11/05 OEM configuration.
- In-house peripheral and integrated circuit manufacture allows the larger manufacturers to capture a greater share of the total system value-added, a consideration of special importance to their business in Europe (where independent miniperipheral manufacturers remain relatively noncompetitive).
- Improving technology and lower prices have turned low-end CPU manufacture into a low-margin commodity business, with reduced opportunities for product differentiation and premium pricing. Peripherals, memory, software and services have held up eroding profits on low-end products, which are often priced as entry vehicles for capturing subsequent higher margin upgrade businesses.
- A comprehensive line of standard CPU, peripheral and memory components gives some mini vendors the flexibility to construct system packages which more directly address the needs of vertical markets.

In order to successfully carry out the product strategy suggested above, the mini/micro companies need to achieve economies of scale in all product lines through volume shipments. Thus, one or more of the following strategies suggest themselves:

1. Retain and preserve experienced employees while improving productive capacity thorugh inventory building.
2. Form a special components group to help build volume on processors, peripherals and other electronics.
3. Control price concessions and liberal credit terms to lock in higher volume, recurring OEM business. Incidentally, OEM sales by the mini vendors accounted for the lion's share of their revenues in the past; this trend is now being reversed (see Figure IX-3).

With lower costs should come the ability of some manufacturers to sustain market leadership through pricing flexibility and development of additional standard components and configurations. (see Figure IX-6). Further cost benefits for higher volume include:

- Economies of distribution and maintenance, made possible by higher geographic installation and shipment densities.
- Additional units over which to spread the fixed expense of developing sophisticated software systems, as well as additional R&D funds to develop applications software for penetrating new markets.

Mini Market Shares

Market shares of the major suppliers are shown in figures IX-6 and IX-7.

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In Depth: The Waves of Change

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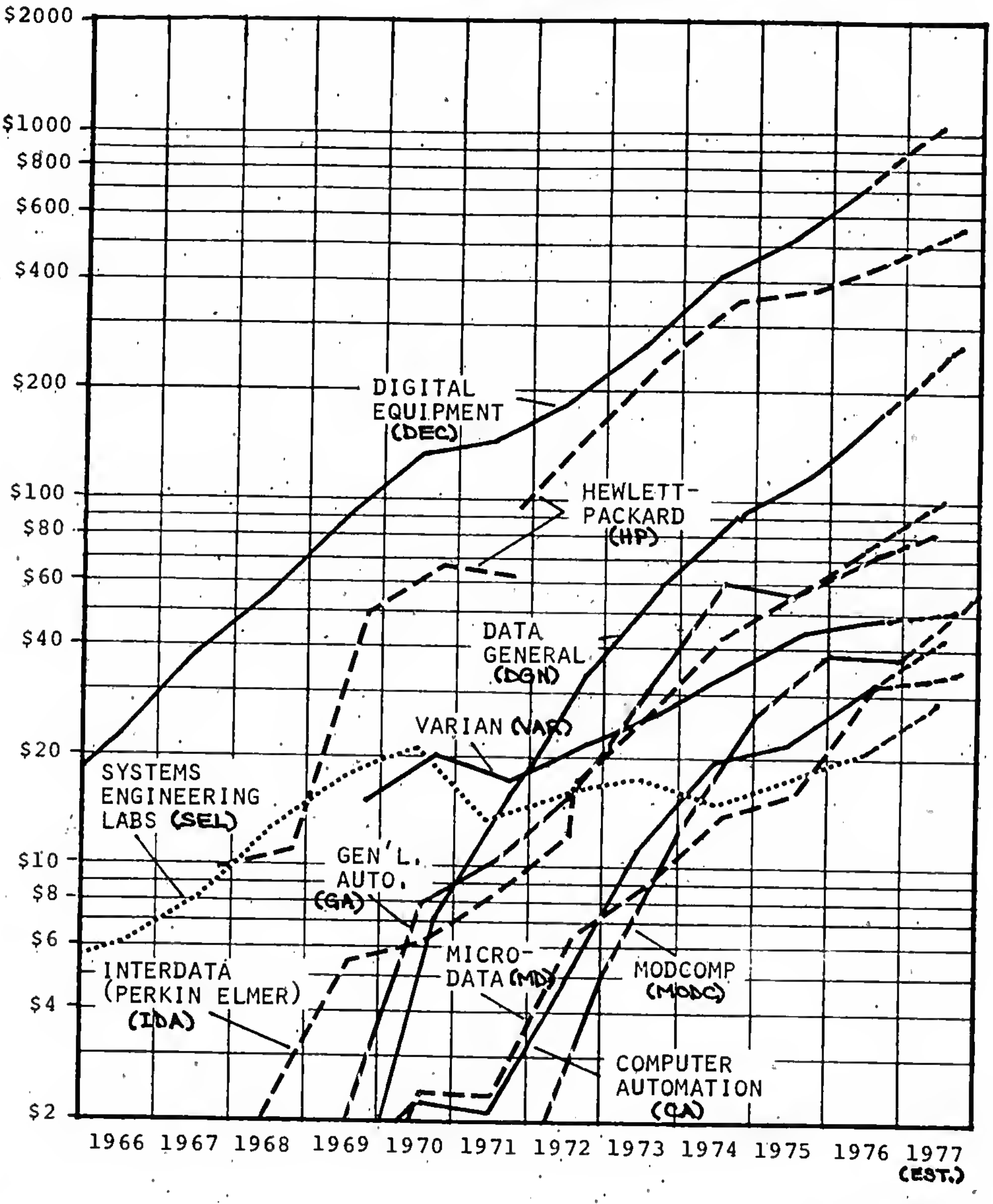
According to Bache, Halsey, Stuart, Inc., a respected Wall Street investment brokerage and market analysis firm, "Digital ranks first and will maintain that position indefinitely. Hewlett is currently in second place, with prime emphasis on larger systems aimed at time-sharing use and for sophisticated industrial automation applications.

"IBM's apparent strong showing is the result of its overpriced and aging System/7, sold into three or four specific narrow markets where massive IBM support can be used to justify the prices.

"Data General's seemingly distant fourth place is deceptive. Data General is the fastest growing mini supplier of size and is following a strategy similar to Digital's in placing as many systems as possible, laying the groundwork for future larger volume sales.

"General Automation has been growing rapidly, but a series of problems impacted growth in the past year. Honeywell emerges from relative obscurity with its new mini line, which has been quite successful in Honeywell mainframe accounts.".

Figure IX-6. MINICOMPUTER REVENUES OF SELECTED COMPANIES (IN MILLIONS)



SOURCE: Bache, Halsey, Stuart, Inc., updated by ACT

The years shown along the horizontal axis represent the fiscal or calendar basis of financial reporting used by each of the indicated companies, depending on their individual practice. All 1977 figures are estimates based upon ACT's sources of information. In millions they are (from top to bottom): DEC, 1050; HP, 575 (figures include minicomputers and scientific calculators, and have been reclassified from 1971 onward); DGN (including Digital Computer Control results as pooled), 260; IDA, 100; GA, 81; MODC, 56; VAR (revenues of data products group, now part of UNIVAC operations), 51; CA, 43; MD, 36.5; SEL,28.

However difficult it is to track the market shares of the larger mainframers (IBM, Honeywell, Burroughs, Sperry Univac, NCR, Control Data Corp., etc,), it is substantially more complex a task to establish the minicomputer market positions with any degree of accuracy. However, it is clear that DEC is, effectively, the "IBM of the minicomputer market" and that, together with IBM, Hewlett-Packard and Data General, it forms the top tier of that market.

Honeywell, General Automation, CDC and others represent the second tier market, although it should be noted that the gap in market shares that separates the two tiers is of formidable width.

Reaons for Demand

According to C. Casle, a Bache, Halsey, Stuart, Inc., vice-president, there are five major factors stimulating minicomputer demand:

1. "Continual declines in semiconductor costs are passed along in minicomputer pricing, expanding existing market opportunities and opening new ones. This trend appears unlikely to change for several years.".

2. "Manufacturing processes, office practices and regulatory compliance are increasing in complexity. Apart from other considerations, these spur automation simply to cope with the burdens additional complexity causes. The minicomputer is a primary automation tool independent of process."

3. "Labor costs continue to rise, minicomputer costs continue to fall. Each increment of change adds to the number of situations where automation becomes financially attractive." Consider, in this context, the cost of a given mini as compared with the average cost (in salary alone) to the employing U.S. company of a single clerk — $8,000 to $10,000.

4. "Semiconductor performance gains are being passed on by minicomputer makers as improved access to automation and computation. Each increment widens the number of people that can access computers and reduces the complexities of use. This trend appears to be continuing."

5. "Electronic arbitrage. Mini makers sell cheap what mainframe vendors rent dear. Some leading edge users, such as Citibank, Hartford Insurance and others, are taking advantage of hardware price discrepancies. This trend is in the formative stages since the level of sophistication required to successfully play the arbitrageur role is very high."

Impact on Mainframes

The mini/microcomputer or component suppliers will *not*, in my judgment, severely impact the major mainframes for the following reasons:

- When the *system* purchase price exceeds roughly $100,000, the cus-

(Continued on Page 87)

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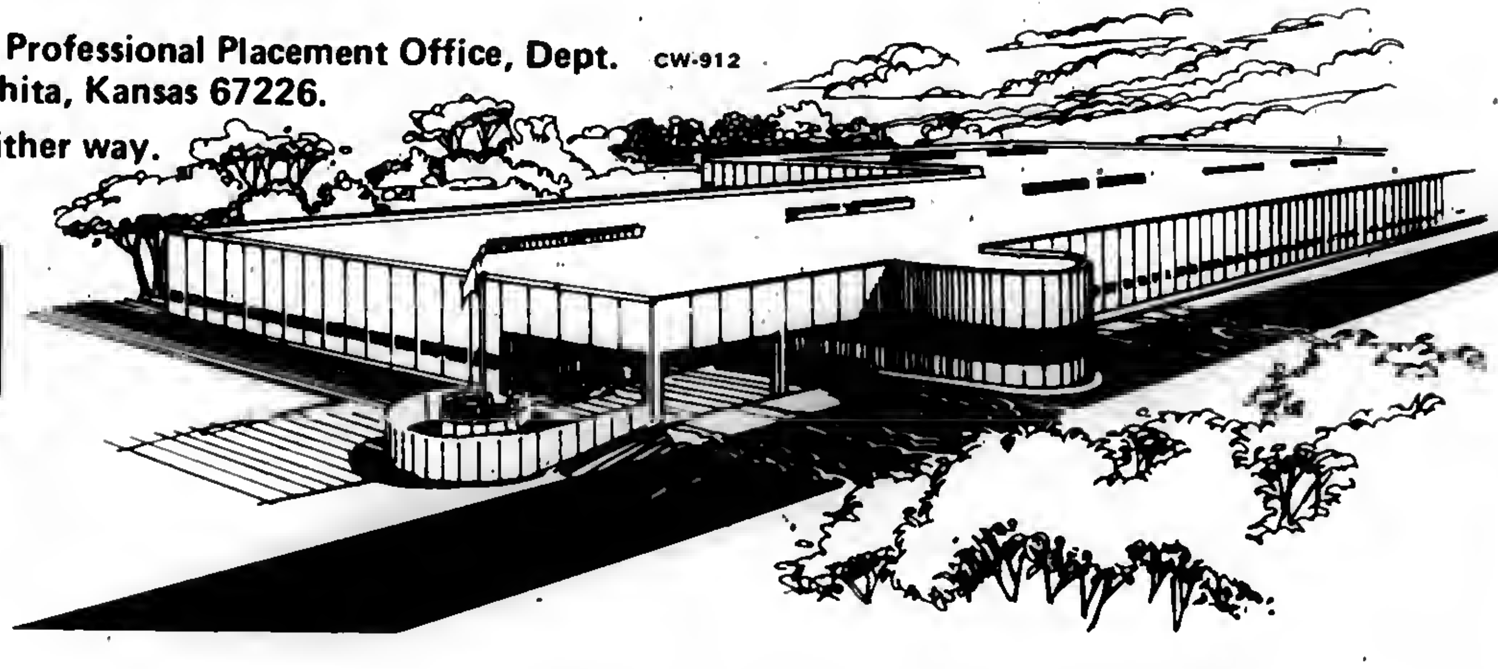

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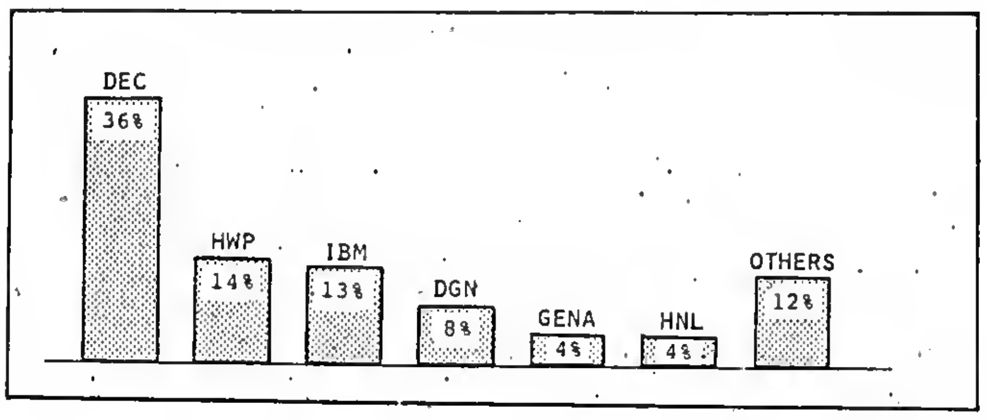
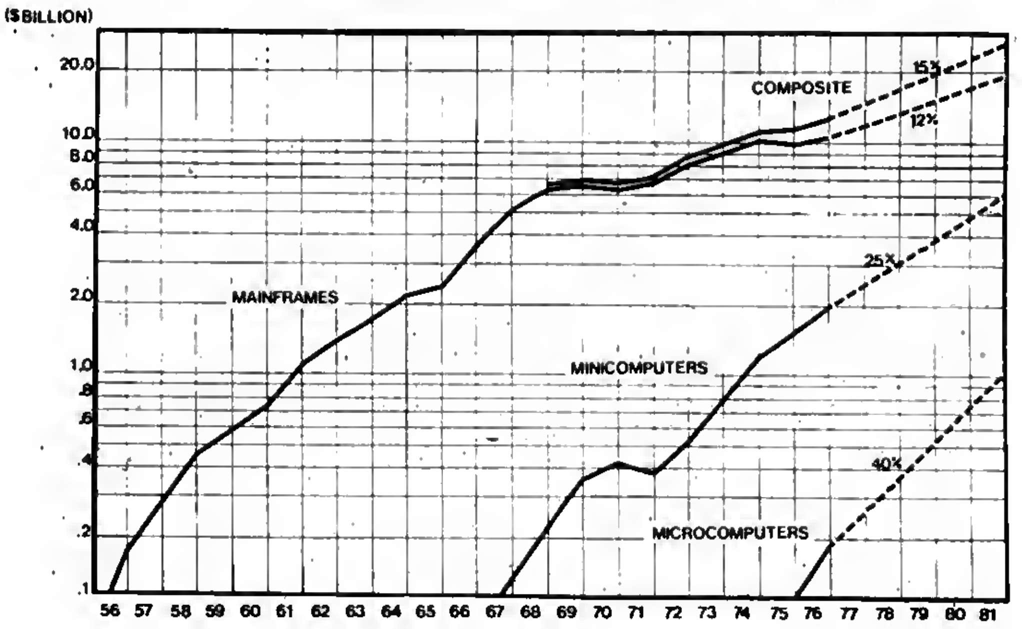
In Depth: The Waves of Change

Figure IX-7. ESTIMATED SHARES OF 1976 MINICOMPUTER SHIPMENTS OF $2.0 BILLION



SOURCE: Bache, Halsey, Stuart, Inc., updated by ACT

Figure IX-8. ESTIMATED SHIPMENTS & COMBINED TOTALS BY YEAR



(Percentages Represent Growth Rate Projections)

SOURCE: Bache, Halsey, Stuart, Inc.

(Continued from Page 85)

tomers generally become more concerned about software, support, maintenance and vendor viability (not raw hardware price/performance).

- The price war between the mini/-micro and component suppliers will continue to force the price down, and the resulting profit margin erosion will force many smaller firms out of business.
- As minicomputers attempt to penetrate the medium to large-scale general-purpose markets (IBM 135 and up class, although the definitions of medium to large are rapidly changing), the quality and selection of I/O devices are increasingly important.
- Future customers (1980s) will be more and more interested in security, flexibility, adaptability, operational human factors, application development and maintenance capability — not "raw" CPU power or bits and bytes. Besides, many low-end computer systems are I/O or peripheral limited anyway.

Furthermore, *all* of the major mainframers or systems competitors are gradually replacing hard-wired logic modules with microprocessors. In so doing, they are attempting to enhance or expand their current system performance, improve reliability, accessibility and serviceability, reduce size and power requirements and lower costs.

Figure IX-8 clearly shows the current and projected high annual growth rate for microcomputers (40%). However, this significant growth is from a relatively low shipment base of about $200 million last year. Minicomputers also enjoy a growth rate (25%), which is presently estimated to be more than twice mainframe shipments (12%).

However, mainframe shipments may pick up in 1977-78 as the IBM 138/148/3033 machines begin to be delivered in volume). Moreover, since large minicomputers tend to overlap so-called mainframes, one must not depend on the absolute values. Figure IX-8 only shows a relative trend over time.

At least a dozen important applications for microprocessors in traditional medium to large-scale systems can currently be identified:

- Front-end communications processors.
- Remote concentrators/multiplexors.
- Maintenance processors.
- Disk controllers.
- Magnetic tape controllers.
- Hierarchical storage controllers.
- Memory access controllers.
- Nodal processors (in a network).
- Terminal controllers.
- I/O processors (replacement for channels).
- Intelligent terminals.
- Encode/decode devices.
- Office automation.

Collectively, the above list represents

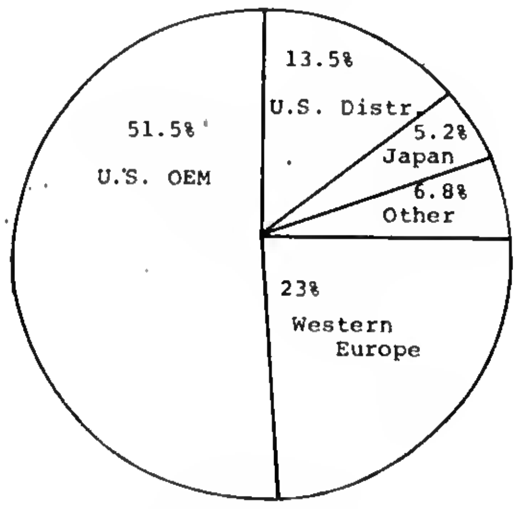
(Continued on Page 88)

Figure IX-9. EXAMPLES OF MICROPROCESSOR PRODUCTS

Supplier	Model	Supplier	Model
Advanced Micro Devices	2901 AM9080A	Panafacom Ltd.	PFL 164
American Microsystems, Inc.	S9209 S6800	RCA	CDP-1801 CDP-1802
Electronic Arrays	9002	Rockwell	PPS-4 PPS-8
Electronic Memories and Magnetics	PC25	Scientific Micro Systems	SMS 300
Fairchild Camera & Instrument	PPS-25 F-8	Signetics	2650
General Instrument	LP 8000 CP-1600	Solid State Scientific	CRD-8
Harris Semiconductor	IM6100	Texas Instruments	SPD0400 8080 TMS 1000 TMS 9900
Intel	4004 4040 8008 8008-1 8080 8080A 3000	Western Digital	CP-1600
Intersil	IM6100		
Monolithic Memories	6701		
Mostek	5065 F-8		
Motorola	M6800 2901		
National Semiconductor	IMP SC/MP PACE		

Figure IX-10. SEMICONDUCTOR BOOKINGS - 1976

(Includes: Microprocessors, ROM/RAM, and other IC's)



TOTAL WORLD = $ 3.85 Billion

SOURCE: ACT estimates from WEMA data

In Depth: The Waves of Change

(Continued from Page 87)

a very substantial portion of the system's "added value" and revenue. It is important to realize that only two or three microprocessor performance levels are required to handle the above dozen or so functions and that many systems will require multiple usage of the same type processor(s) (see Figure IX-9) for fail-soft operation.

Price/Performance Factors

The potential performance capability of a microprocessor or miniprocessor depends on many interrelated and interdependent factors:

- Processor speed is determined by CPU cycle time, instruction set size, efficiency and "richness" and efficient memory (ROM/RAM) utilization.
- Input/output capability depends on the number of I/O channels or ports, the channel band-pass or width, etc.
- Memory speed and range (ROM/-RAM) can be critical if multiple applications are planned, and speed or capacity range will often represent a key limiting factor in the overall performance equation.

Price represents the most important criterion for many users, especially at the low end of the microprocessor spectrum (e.g., single-chip 4- or 8-bit products such as the Mostek 3870, Intel 8748, Texas Instruments 9940, TMS1100, etc.). However, wherever practical, price must be evaluated on the basis of the answers to a wide range of critical questions.

For example, how much ROM/RAM is included? Are additional supporting circuits required (for I/O functions or power supplies, etc.)? Are second sources available? What is the current track record of the vendor in terms of credibility, financial stability, availability of supporting software (tools)?

Summary of Trends

Looking ahead to the near term (1977-80), there will be:

- Greater competition between IC vendors and mini/microcomputer suppliers.
- Greater competition between mini/microcomputer suppliers and general-purpose mainframe manufacturers.
- Increasing consolidation/mergers of IC/mini/micro, miniperipheral and mainframer companies to obtain economy of scale and more added value (vertical integration).
- Far more emphasis placed on software and end-user support services.
- More cost-effective, larger word size machines (32 bits) and memory ranges.
- Substantially increased usage of mini/microcomputers in distributed systems networks as "nodal" processors or terminal processors.
- Use of 64K-bit memory chip in products by 1979 (Figure IX-10).

Today's industrywide preoccupation with distributed systems is heavily influencing product planning in the mini/micro arena. If users are confused with the power and scope of current systems offerings, it appears that the manufacturers are too. The degrees, dimensions and deployment of systems distribution are the key confusion factors. These issues (and others) will no doubt be clarified in the future.

Meanwhile, users are confronted with the dilemma of choosing between multiple mini/micro vs. maxi power. Can several midgets successfully compete with one tall basketball star?

It depends on the court.

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and the Data Processing Management Association.

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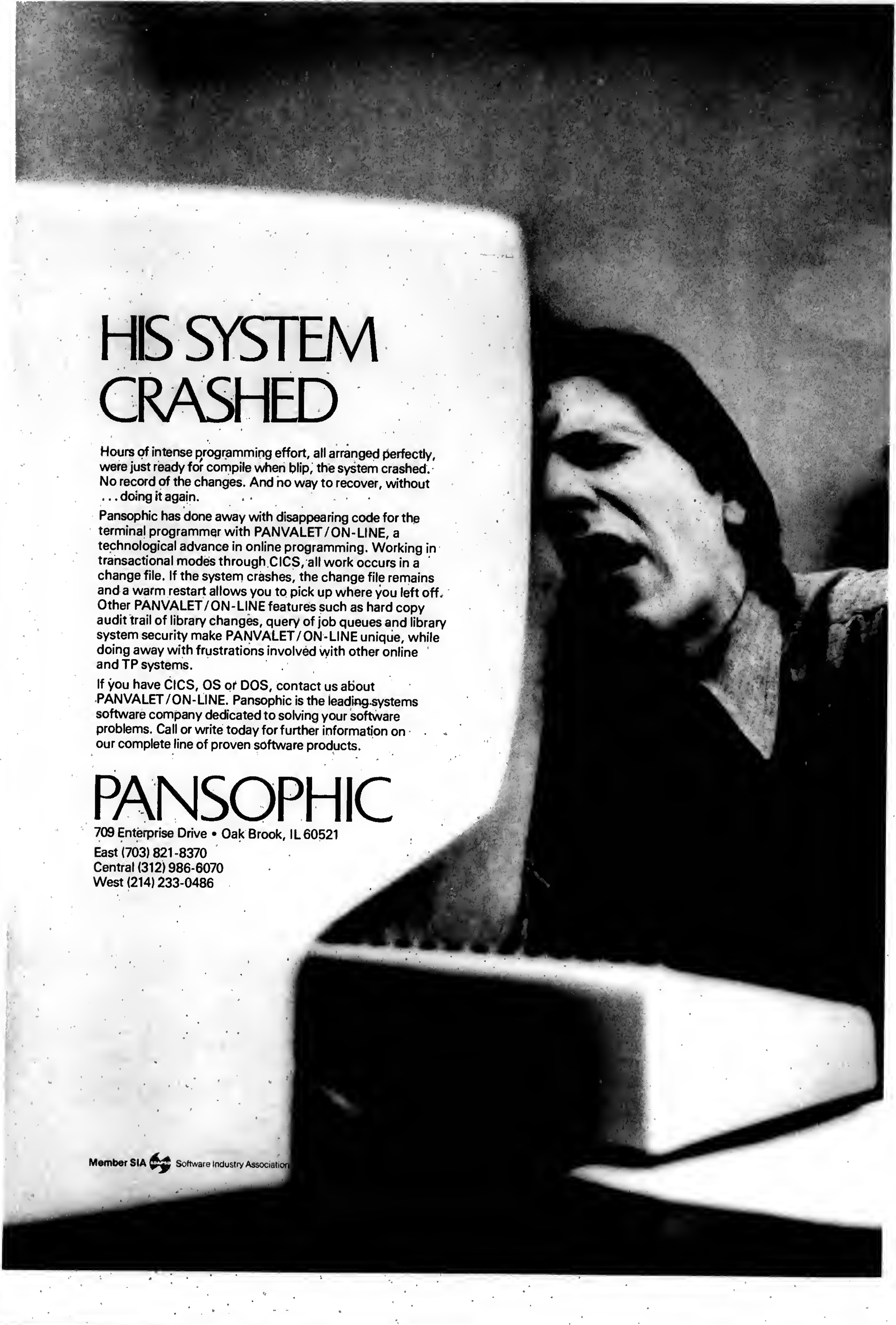

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Low-Speed Printers Holding Their Own

WALTHAM, Mass. — Despite the allure of inkjet technology, lasers and the 45,000 line/min speeds offered by the much-touted high-speed printers, low-speed printers are holding their own.

In fact the value of the installed base for printers that operate below 3,000 line/-min is expected to grow from $3 billion in 1976 to over $6 billion in 1981, according to *EDP/Industry Report* (EDP/IR), a newsletter published by International Data Corp. (IDC) here.

EDP/IR highlighted several trends which will be apparent throughout the rest of the decade:

- "The technology at the slower speeds is evolving. Matrix printers are taking over from fully formed character printers; bank technology is invading line printers; nonimpact devices are blossoming."
- "Major OEM acccounts are going in-house with printer production, hoping to add to the reliability of their products while trimming costs . . . and meanwhile keeping the OEM market in flux."
- "Microprocessors are adding function to output devices as variable fonts, increased print control and error detection find their way into the industry's new products."

Printers with speeds over 3,000 line/min will lead the overall market, growing from 2% of dollar value in 1975 to 15% of value in 1981, but the low end of the market — printers with speeds from 10- to 30 char./sec to 600 line/min — will nonetheless experience an annual growth of about 20%, the report noted.

Line printer shipments will grow from 60,000 units this year to almost 75,000 units by 1981, a year in which OEM revenues could well amount to over $250 million, EDP/IR projected.

While slow-speed line printers have traditionally found their niche at general computer sites, by 1981 installations at small business computer sites should be a rival, the newsletter proposed.

"Growth will come from the large base of matrix printer users in the small site and minicomputer base as users fleet up to the faster devices as their output needs increase," it stated.

By 1981, the U.S. installed base of character printers should be about one million units, equal to abut 75% of all printers used with general-purpose computers, minicomputers, terminals and shared-logic word processors.

IBM Trial 'Non-Event': Stock Analysts

By Molly Upton
CW Staff

As the U.S. vs. IBM trial drones into its third year and nears the changing of the guard from the government offense to IBM's first display of its defense tactics, several stock market analysts discount any near-term effect of the trial on stock market activity.

However, one analyst said he sees a slightly higher probability of a consent decree.

The Justice trial is a "non-event" as far as the market is concerned, according to John McManus, vice-president of Kuhn Loeb & Co.

Another New York analyst indicated the trial is not expected to be a real factor in investment considerations over the next year or so.

Other cases can have more of a psychologically damaging impact to investors' views of IBM than the Justice Department's action, he continued.

Gideon Gartner, a vice-president at Oppenheimer & Co., believes the probability of a consent decree is higher than it has been in the past.

If the Justice Department asks Judge David N. Edelstein to grant interim relief on certain items, logically it could then take those conditions to IBM as the basis for a consent decree, he said.

However, this thought is probably too optimistic because the chances of Justice being granted relief are slim, according to Gartner. Justice would have to prove that the public is being irreparably damaged and that the terms of the relief would not irreparably harm IBM, he said.

But, he continued, "it's about time someone came to their senses." The trail's duration is not doing the Justice antitrust staff, IBM or the competitors any good.

James Blair, first vice-president of White Weld & Co., said the only effect of the trial on IBM stock would be if something significant happened in terms of a settlement. That doesn't look like it's in the offing, he added.

Whereas two or three years ago analysts' commentaries were full of speculations over terms of a consent decree, analysts have now come to accept the fact that no premature ending is on the horizon, Blair said. They are thinking this litigation is going to drag on forever, he pointed out.

"I think this is in large part the result of IBM's successes in court. You could hardly call Greyhound a setback for IBM — it's basically just reopened another item of litigation. But IBM has not been penalized for litigating other than the management time and expense associated with it."

"I don't think there appears to be any great incentive for IBM to accelerate settlement here, and thus I don't think we're going to

(Continued on Page 92)

SSA Revises RFP for OCR Gear As Result of Vendor Protest

By Edlth Holmes
CW Staff . .

WASHINGTON, D.C. —. The Social Security Administration (SSA) is amending its specifications for optical character recognition (OCR) equipment as the result of a protest made by a small California-based firm, Information International, Inc.

The SSA request for proposals (RFP), issued in August for what is expected to be the largest purchase ever of OCR equipment by the federal government, was designed to accommodate the agency's present scanning devices, according to Dr. F.N. Karmatz, an Information International consultant.

Those devices are largely of IBM and Recognition Equipment, Inc. (REI) manufacture, Karmatz noted.

The SSA failed to ask for "an overall — equipment and labor — solution" to the problem it faces in complying with a congressional directive that the agency share Social Security information with the Internal Revenue Service (IRS), he said.

Under the legislative changes aimed at eliminating duplication of effort by the SSA and the IRS, the agencies will both be reading new W-2, W-2P (pension) and W-3 (summary) forms. Public Law 94-202 eliminates the need for almost five million employers to file quarterly 941 reports to the SSA.

The SSA must now handle 158 million earnings items or about 70 million documents filed by these same employers, however.

"Conservative estimates" indicate that these documents, prepared on a great variety of computer printers, typewriters and accounting machines, will translate into 32 billion characters of information that have to

(Continued on Page 92)

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SSA Amends OCR RFP After Vendor Protest

(Continued from Page 91)

be correctly processed by the SSA by 1979, Information International stated in a "white paper" on the project.

The California firm charged that "the technicians who prepared the RFP have taken a narrow and 'safe' approach by limiting their procurement to types of equipment they are already familiar with — paper scanners which [the SSA] has used for the past eight years. SSA has asked for a device rather than a system."

Information International believes it has a system, a microfilm reader-OCR system, that will more than satisfy the SSA requirement that its new equipment be able to scan 94% of alphabetic characters and 96% of numeric characters.

The firm's Grafix I system microfilms raw documents at up to 20,000/hour; its OCR equipment then reads the film, having generated a permanent record of the documents.

The British Health and Social Security Department is currently employing Information International's system with a 99.1% eficiency rate, and the system has literally paid for itself in savings over 14 months of use, the company claimed.

The U.S. Navy is also using the Grafix I system for handling data records.

Ability Demonstrated

On June 16, Information International demonstrated its capability to read the new W-2 and related forms for an SSA team and proved its system could outperform the agency's RFP requirements by a margin of three to two in the area of rejected forms and by a margin of nine to one in the area of substitution corrections.

The agency would need a minimum of 7,300 people to process the rejects and make corrections if it is to fulfill the RFP scanning requirements with the kind of equipment it has now. No more than 635 people would be required to achieve the same results, however, if the Grafix I were used, Information International said.

"The RFP is also written to procure the least expensive machine that will meet its specifications. It ignores the fact that it will take additional equipment and human effort to read the great volume of incoming data which the low-cost scanner does not read, and it ignores the much larger labor cost that is required to correct the errors introduced by the scaning devices themselves," the company added.

Admittedly, a Grafix I system costs several times more than a single paper scanner, Information International noted, and the system reads microfilm instead of scanning paper.

But because the SSA already microfilms all its forms for its record depository, the Grafix I would use this source at no additional cost to SSA.

Had the RFP gone unamended, the agency would have locked itself into "a self-bankrupting system that would cost taxpayers an extra $1 billion to $1.5 billion over a five-year span, the expected life of the new system," Information International said.

Following the firm's protest, the SSA sent a letter to interested vendors advising them that it would amend its RFP to include nonpaper-reading scanners. The agency also promised to revise its cost projections for the procurement and extended the reply date for the RFP from Sept. 8 to Sept. 29.

At press time, Information International was waiting to receive the new technical SSA specifications.

The agency's final decision will be made on the basis of total cost to the government, not just the initial hardware price tag, an SSA spokesman said.

Analysts Show Apathy to Trial

(Continued from Page 91)

see anything evolve in the near term. That's what stock prices are all pretty much assuming," he commented.

Looking at the litigation IBM faces now and in the future, Blair said he tends to think the more significant trial in the near term might be the Memorex case. That action is tentatively scheduled to begin in January.

Extrapolating from the performance of the Memorex executives on the witness stand for the Justice Department, Blair said he would be more concerned about IBM's outcome in that case.

"Probably the only thing that has come out of the Justice effort is the forerunner to what might evolve out of the other cases," he added.

But Gartner, said he's not sure investors have discounted the Justice trial as a factor. They're saying it on the one hand, but the price does not necessarily indicate that, he said.

There was some disagreement over the impact of the Greyhound decision ordering the case back to trial. One analyst indicated that since IBM's stock is so closely balanced between buyers and sellers, the decision might have an impact on portfolio managers who remember the days of the Telex decisions and the 100-point drop in stock within a year.

They may prefer to postpone any buying action for a while, he said.

But McManus said the Greyhound decision should have no effect on IBM stock. Although it is a setback, one must remember that IBM has yet to show its defense and "I think it can defend its position," he said.

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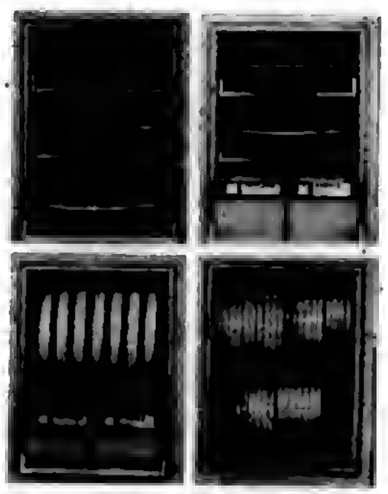

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To Approach $3 Billion

Rigid Disk Drive Revenues Seen Peaking in '79

By Toni Wiseman
CW Staff

MOUNTAIN VIEW, Calif. — The moving head rigid disk drive industry sold an estimated $1.87 billion in disk drives worldwide in 1976, and 91% of this volume was shipped by U.S. manufacturers.

Based on existing or announced products, the industry can anticipate a peak in revenues in 1979 at $2.95 billion, with a slight decline in 1980 to $2.91 billion, according to a report by James N. Porter, a management consultant.

Worldwide revenues for U.S. manufacturers should reach $2.66 billion in 1979 and $2.81 billion in 1980, according to Porter's *1977 Disk/Trend Report.*

"It is considered likely that new products not yet announced will prevent any decline in actual sales at the end of the decade," the report stated. "The forecasted average annual growth rate (AAGR) of 12% through 1980, representing the effects of old age in the product life of several of today's products, will be exceeded if significant new products are introduced at rates similar to past experience.

"A reasonable estimate of AAGR on this basis is 18% to 20%, which would place 1980 total revenues at $3.6 billion to $3.9 billion," it said.

Moving head rigid disk drives are produced by 23 U.S. manufacturers, plus 11 in Japan and Western Europe.

About 70% of all drive revenues represents captive prodution, and the remainder are produced by the plug-compatible manufacturers (PCM) and OEM market, the report stated.

'Confusing' Industry

"The industry structure can be confusing, even to industry participants, but follows most of the classic rules for free-market industries: Noncaptive manufacturers sell drives, alone or with related hardware, directly to every type of industry participant.

"Questions of technical capability, manufacturing facilities and quantity requirements control whether various industry levels buy directly from the drive manufacturer or through a reseller," *Disk/Trend* noted.

The report pointed out that vertical integration has been a strong trend in the industry, noting that with the exception of IBM, all the U.S. captive drive producers used to be OEM drive customers for all or part of their requirements.

IBM holds about 40% of the drive market, compared with its 70% share of the mainframe market. The PCM programs of several drive manufacturers, which displace potential IBM revenues, and the disk drive requirement of the minicomputer segment, which IBM has only recently addressed, account for the difference in market shares, the report stated.

"The short-term loser in market share is the PCM business, which held 14% in 1976, but will drop to 9% and stabilize at that proportion, as independent manufacturers hurry their 3350 drives to the market to replace lost 3330 shipments," *Disk/Trend* predicted.

The report forecast fixed disk drives will account for more than half of all drive revenues by 1980. Worldwide shipments of fixed disk drives up to 12M byte will grow from $87.7 million in 1976 to $340.1 million in 1980, while drives with over 200M byte will grow from $219.5 million to $849.7 million.

Decreases are expected in most disk cartridge and disk pack drives as well as in data module drives.

Disk cartridge drives up to 12M byte will drop from 23.5% of shipments in 1976 to 12.5% by 1980, pack drives of 29M byte to 58M byte will show a similar decline from 7.2% of shipments to 3.3% while those with more than 100M byte will drop from 35.% to 11.6%, the report predicted.

Data module drives' market share will also drop, from 13.7% to 1.2%.

Disk cartridge drives of 12M byte to 55M byte, on the other hand, will see an increase in market share, from 1.1% in 1976 to 5.6% in 1980. Storage module drives of 25M byte to 80M byte will also see an increase, from 2.7% of total shipments to 11.5%, the report stated.

Competing Techiques

No competing technology is likely to have a significant impact on the market for moving head rigid disk drives prior to 1980, *Disk/Trend* stated. "Several emerging technologies will, however, find specialized segments of the data processing market responsive to the new capabilities offered, even at comparatively high prices.

"The production programs thus initiated will lead to future cost reductions which probably will have a greater effect on disk drives later in the 1980s," the report said, noting that so, the one feature offered by disk memories not under attack by competing technologies is removability.

For further information on the *1977 Disk/Trend Report*, contact James N. Porter, 1224 Arbor Court, Mountain View, Calif. 94040.

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Chances Slim for Penetration of Soviet Market

By **Bohdan Szuprowicz**
Special to CW

Is there a Soviet market for Western computers?

At first glance the answer would appear to be yes, since several spectacular sales of large Western computer systems to the Soviet Union have been widely publicized. But whether a worthwhile market share can be realized in the Soviet market by any Western computer manufacturer is another question altogether.

Yet that should be the main objective when attempting to penetrate this potentially huge but centrally controlled market with Western equipment, which is much more advanced than domestically manufactured Soviet computers.

International News

This basic issue, although completely overshadowed by strategic technology transfer considerations, has resurfaced once again with the controversy over the export license for Control Data Corp.'s Cyber 76, which was sold to the Soviet Hydro-Meterological Institute two years ago.

The Cyber 76 is one of the fastest Western computers on the market with processing speeds in the order of 10 million to 12 million instructions per second, while the top Soviet machine at present is still the venerable BESM-6 which is rated at 0.8 million to 1 million operations per second. The top Soviet Riad computer, the EC-1060 that was finally reported to have been put into production in June 1976, is still rated at 1.5 million operations per second, well below its original design speed.

Thus it is argued by some that shipment of a Cyber 76 to the Soviets would be tantamount to giving the Russians computer technology that would allow them to increase by a whole magnitude their state of the art in large computer manufacture. This is particularly relevant because since 1974 the Soviet Academy of Sciences made no secret of the fact that it is building a prototype BESM-X, now to be known as BESM-10, which it hopes will reach speeds in the 15 million operations per second category.

But the market for such big number-crunchers is limited and academician Dorodnitsyn, director of the computer center of the Soviet Academy of Sciences, stated in 1974 that probably no more than 100 to 150 such large systems will be installed ultimately in the whole Soviet economy, as well as exported to major institutes in East European countries to replace their BESM-6 machines.

So far the Russians have not announced their BESM-10 prototype, which was supposed to go on the air during 1977. Since they obviously have a significant investment in that program already, it is very difficult to believe that they would not want to get some helpful ideas from the Cyber 76 once it is installed in their territory.

Aside from any possibility of diversion of the Cyber 76 for strategic use, the issue is basically one of a fair market share for Western manufacturers in return for such an advance in the state of the art.

So far chances are that once the Russians get their BESM-10 on the air, Control Data or anyone else is unlikely to make another sale of a Cyber 76 in the USSR, Eastern Europe or even India.

A look at the history of Western computer exports to the USSR during the last 1970-1975 Five Year Plan may prove illuminating.

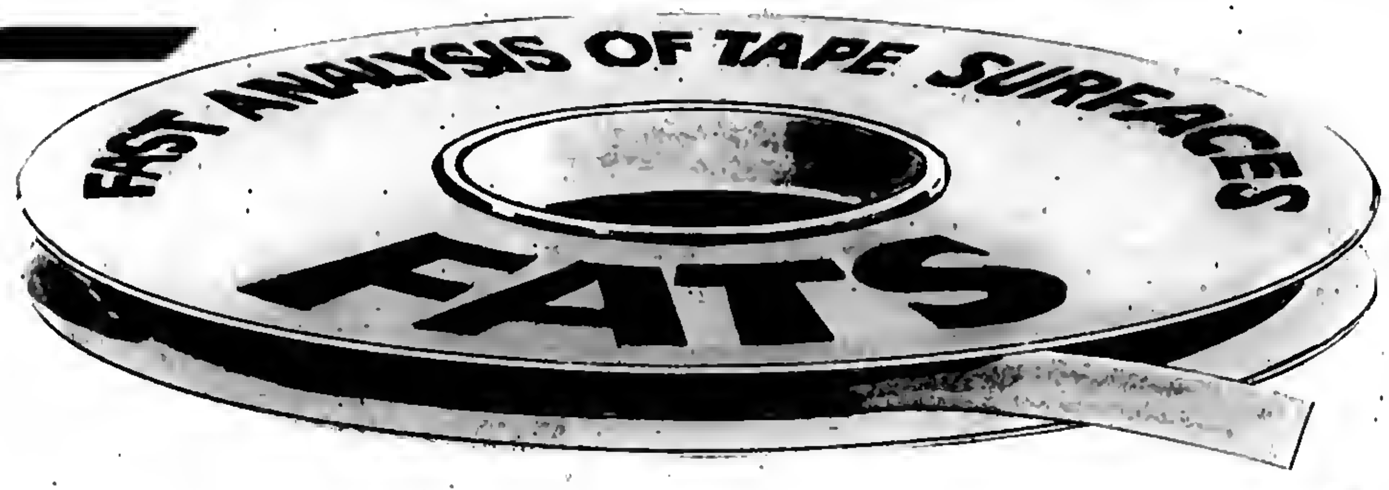
About 200 Western computers have been sold during that period, of which about 50 are relatively large machines such as ICL 4-70, ICL 1906, IBM 360/50, IBM 370/155, Univac 1106, HIS 612, Siemens 4004, CDC 6200, Burroughs 6700, Iris 80 and similar models in great variety.

The other computers consist of small machines and minicomputers such as the HP 2000 series, DEC PDP-11, Mitra 16, Varian 627, Logabax, IBM System 3, Ferranti Argus 700 and a few other models, many of which were shipped as integral parts of various plants sold to the Soviet Union on a turnkey basis often in return for a fair price or even raw materials.

But what is interesting to note about the imports of single Western computer installations is the fact that most represent different computer models from different Western manufacturers, except in a few cases where the nature of the application required a dual system for reliability.

It appears as if someone behind the scenes orchestrated the importation of representative models of the latest obtainable and most advanced Western computers. When offers of large numbers of used IBM 360 computers and later IBM 2314 and 2319 disk drives comparable to Soviet Riad equipment only now being manufactured were made at very attractive prices, these have been consistently rejected.

The total value of all those Western computers exported to the Soviet Union in the last Five Year Plan period is in the order of $150 million realized over five years by at least 20 manufacturers from the UK, France, Germany, Sweden, Japan and the U.S. This just about averages at $1.5 million per year per manufacturer, which is less than what some salesmen are selling within a single block of Manhattan.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International News

Commerce Foresees Minis Boosting Dutch Imports

THE HAGUE, The Netherlands — The economic recession reduced imports of computers and related equipment by The Netherlands during 1975, and available information for early 1976 indicated that little if any, improvement should be expected.

After 1976, however, economic recovery should lead to renewed growth, according to a U.S. Department of Commerce report.

Minicomputers will open up a completely new market here and contribute substantially to the improvement of the total import figures, Commerce added.

In 1973, The Netherlands imported computers and related equipment valued at $153.9 million, of which $45.4 million were U.S. imports. By 1975, total imports grew to $229.8 million with U.S. equipment claiming $63.64 million.

In addition, for the first four months of 1976, U.S. imports accounted for $20.9 million of total imports of $72.7 million, according to Commerce figures.

"U.S. suppliers hold a dominant position in The Netherlands' computers and computer related equipment market," the report indicated.

"Domestic production is mainly in the hands of U.S. subsidiaries, except for Philips, the Dutch multinational, which produces some minicomputers and peripheral equipment with a special attraction in the Dutch market."

Commerce noted that while the U.S. position in the mainframe sector is secure, strong European competition is being encountered in the peripheral area.

Foreign Orders & Installations

Ontario Hydro has ordered a Univac 1100/42 system to be installed at its System Control Center in suburban Toronto.

South African Coal, Oil and Gas Corp., Ltd. has ordered Honeywell instrumentation equipment worth $11.5 million to monitor the world's largest oil-from-coal complex.

Shell Canada Ltd. has ordered a Flic system from Metromatication International, Inc. to be installed in its research facilities at Oakville, Ont.

Prestil Eclair, a zipper manufacturer in Rouen, France, has ordered a Model 7110 system with six terminals for order entry applications from Inforex, Inc.

Six European banks have ordered IBM 370/158 and 370/168 add-on memories from Electronic Memories and Magnetics Corp.

D. Stempel AG, West Germany, has ordered a high-speed, multihead large-format graphics scanner from Optronics International, Inc.

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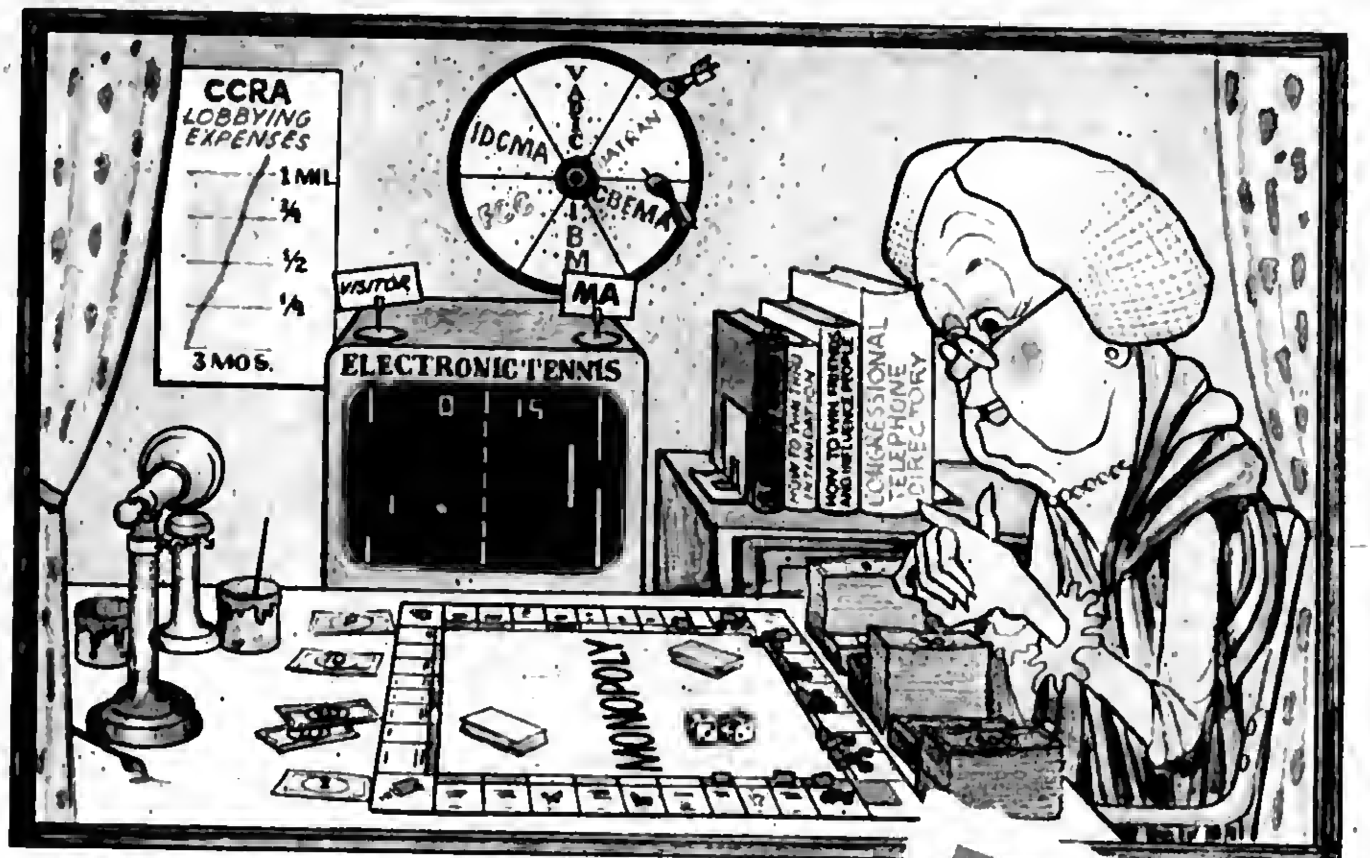

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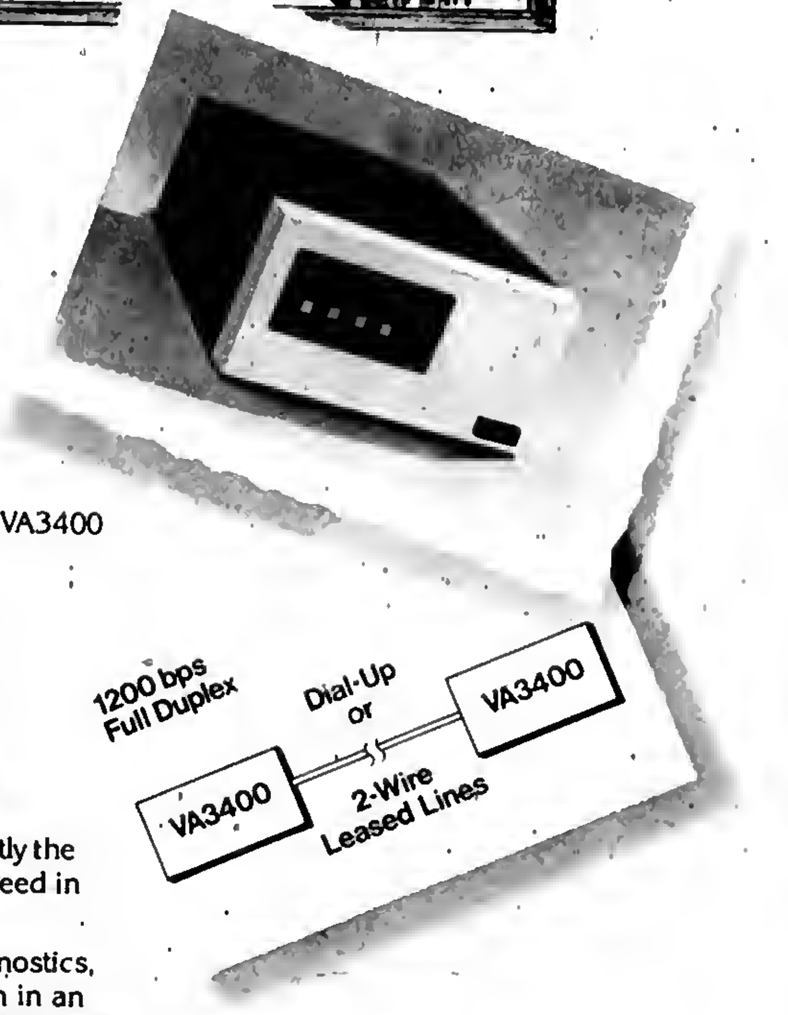

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SBS to Start Satellite Experiment This Fall

McLEAN, Va.— A communications experiment known as Project Prelude will be conducted this fall by Satellite Business Systems (SBS) in association with Comsat Laboratories and other companies.

The Project Prelude experiment will use the National Aeronautics and Space Administration's (Nasa) Communications Technology Satellite (CTS) to test emerging concepts for intracompany communications, including high-speed data transmissions, teleconferencing and facsimile, according to an SBS spokesman.

The experimental transmission of high-speed digitized communications will be at the higher frequencies of the 12-and 14-GHz bands, at which CTS operates.

These communication transmissions will be a prelude to advanced commercial communications to be available in the 1980s to meet intracompany needs of large organizations, the SBS spokesman explained.

Three business organizations will participate in the satellite experiment: Rockwell International Corp., Texaco, Inc. and Montgomery Ward and Co., Inc.

SBS is making arrangements with leading communications equipment manufacturers to supply terminal equipment at each site for the experiment.

Project Prelude will provide an opportunity to plan and develop equipment for high-speed and high-quality transmission capabilities required for future satellite systems, according to the spokesman.

The capabilities and performance of the manufacturers' advanced prototype equipment will be evaluated in a realistic business environment, he said.

The six participating manufacturers are: Advent Corp.; Arvin Echo Corp.; Dacom, Inc.; Harris Satellite Communications Division of Harris Corp., which will supply a multi-data rate, high-speed modem employing QPSK modulation; Hewlett-Packard Co. which will supply a computer systems network; and NEC America, Inc.

The experiments will employ two small transportable earth stations, built by Comsat Laboratories. Each of the participating business organizations, in turn, will have the pair of earth stations installed at their selected sites for several weeks, the spokesman noted.

During the experiment, data will be gathered on user acceptance, economic impact and equipment performance. An evaluation will be published in a report to Nasa and the Federal Communications Commission (FCC), he said.

The experiment is under the overall direction of SBS, which is a partnership formed by wholly owned subsidiaries of Comsat General Corp., IBM and The Aetna Casualty and Surety Co.

SBS has been authorized by the FCC to establish an all-digital, 12/14 GHz satellite system to serve businesses, government agencies and other large communications users.

AIIE Planning Conference On Federal DP Procurement

WASHINGTON, D.C. — A government-industry computer conference on "Federal ADP Procurement: 1978 — The Year of Transition" is being presented by the American Institute of Industrial Engineers (AIIE) in cooperation with key military and civilian agencies.

The conference will be held Nov. 14-16 at the Twin Bridges Marriott Hotel here.

The conference will focus on federal ADP procurement issues from two perspectives: policy agencies, represented by the Office of Management and Budget, the General Services Administration and the National Bureau of Standards; and user agencies, represented by the Department of Defense, military and major civilian agencies.

The first day of the conference will offer a status report on major issues given by executives in organizations with governmentwide responsibilities for ADP policy and implementation.

The second day will consist of a series of parallel sessions, stressing agency experience with ADP procurement practices and addressing key issues that affect internal agency procedures. Sessions include: "Teleprocessing Services Program (TSP)", "Developing the Request for Proposal (RFP)," "Management Session: Department of Defense," and "The Post RFP Process."

The third day will feature a panel discussion on proposal evaluation.

Further information is available from Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

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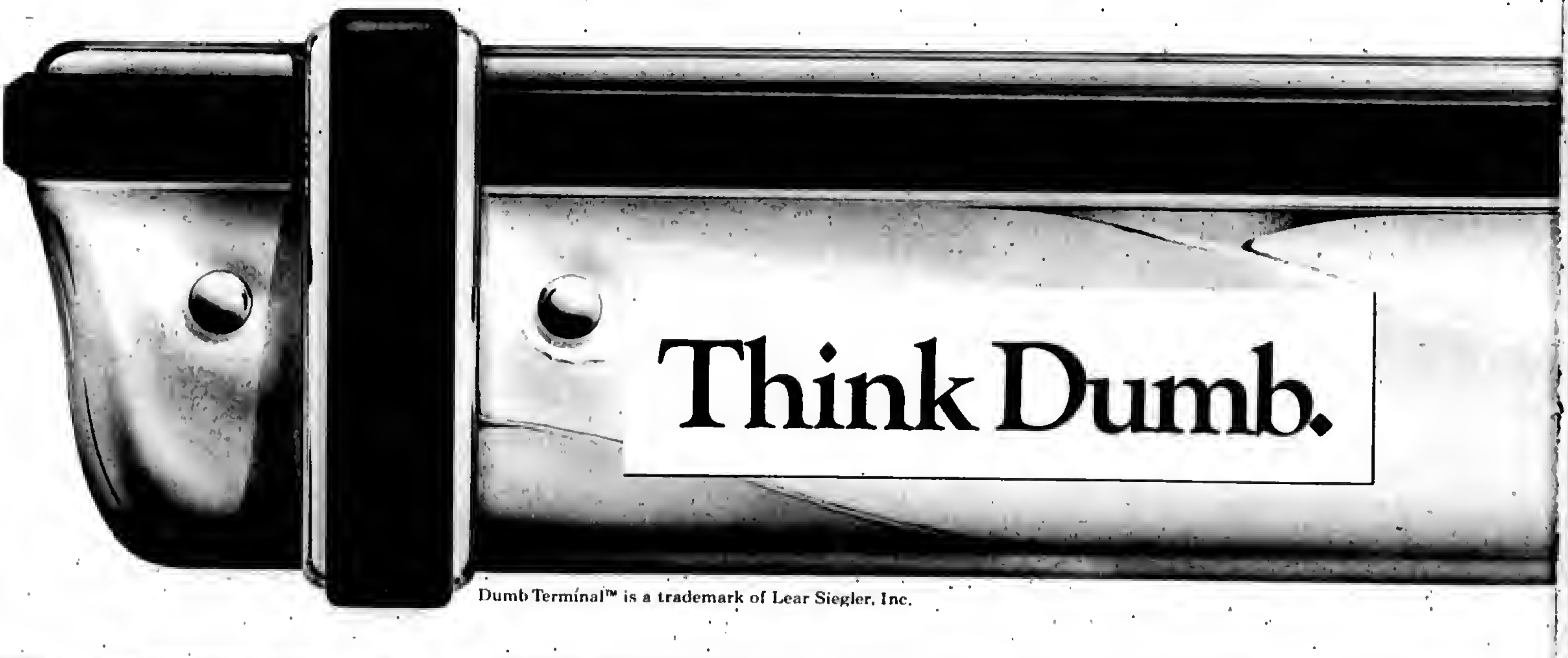

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Executive Corner

Amdahl Announces Key Appointments

SUNNYVALE, Calif. — Amdahl Corp. has announced a series of key management appointments representing the executionary phase of a management enhancement plan previously approved by its board of directors.

Eugene R. White, Amdahl president since 1974, has been appointed deputy chairman.

John C. Lewis, formerly group president of Xerox Business Systems, will succeed White as president, while William F. O'Connell, formerly director of IBM World Trade large systems marketing, has been named senior vice-president, corporate marketing.

Other Changes

- Joseph A. Orlando has been elected executive vice-president of Technicon Corp.
- Daniel A. Hosage has been named vice-president and general manager, communications management products for Datapoint Corp.
- William A. Clarke has been selected as vice-president, business development for On-Line Business Systems, Inc.
- Irwin J. Kusel has been named vice-president of systems and consulting at Cogna Systems Corp.
- James S. Conners has been named vice-president and area manager of National Sharedata Corp., the Western Union Teleprocessing division.
- James Peacock has been named vice-president of International Data Corp. (IDC).
- Philip Schneider has been named vice-president of Advanced Westar for the Western Union Telegraph Co.
- John F. Graham has been named director of Honeywell Information Systems' Industrial Design and Human Factors Department.
- Allan T. DeVault has joined Digital Development Corp. as director of marketing.
- William D. Jobe has been named vice-president for North American sales for Data General Corp.

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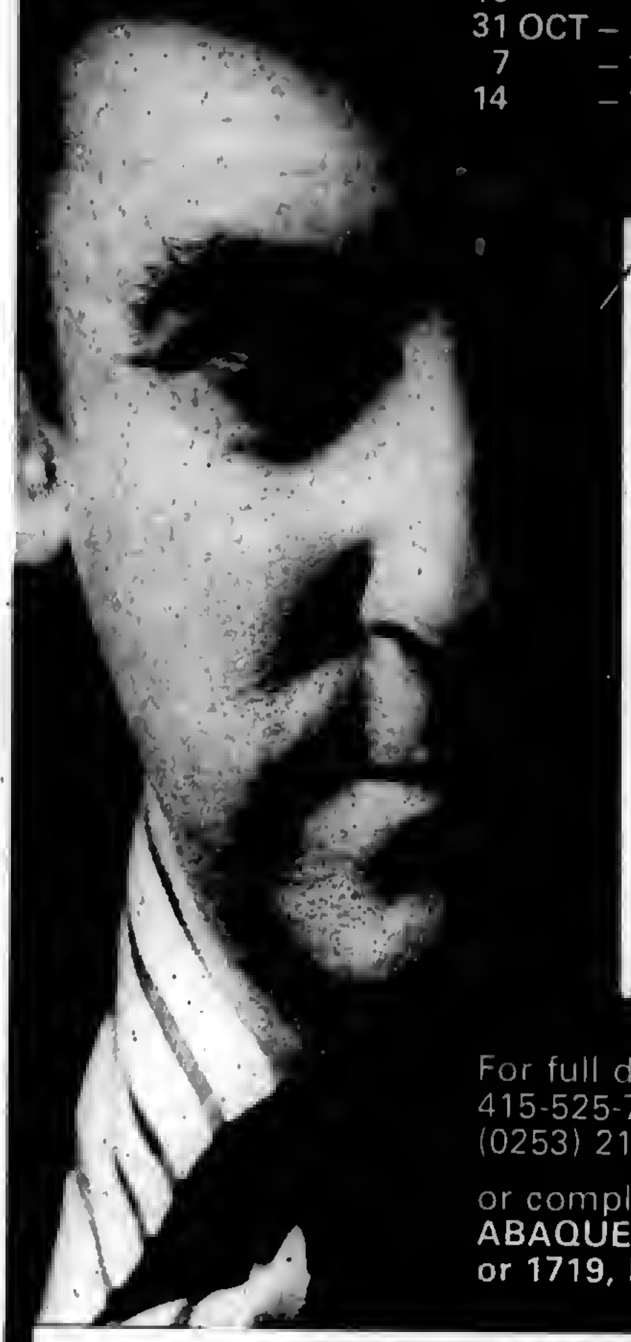

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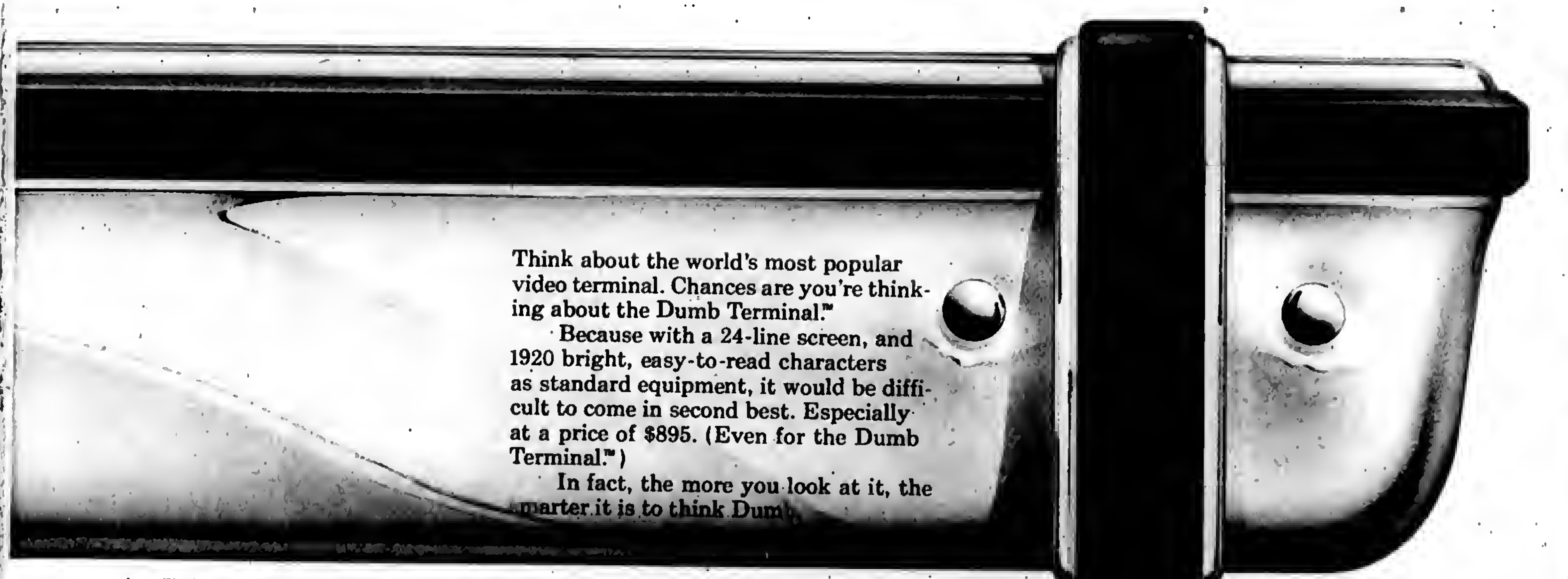

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Wema to Study Drop in Investment Capital

By Edith Holmes
CW Staff

PALO ALTO, Calif. — The dramatic decline in the capital available to start and support the growth of young electronics companies in the U.S. has prompted Wema to form a special task force of industry executives to study and help solve the problem.

Wema, formerly known as the Western Electronics Manufacturers Association, attributed the current lack of investment monies to the continuing increase in the federal and state capital gains taxes over the last eight years. Capital gains taxes have nearly doubled since 1969, stifling any incentive people have to invest their money in businesses — and particularly in small, high technology companies.

These firms require a great deal of capital and their chance of failure is high, according to Edwin V.W. Zschau, chairman of Systems Industries, who will head the task force.

"The situation has become so bad that many would-be companies don't get started and those that do either fail or grow slowly because of capital starvation," Zschau said. "Recently, several have obtained capital from foreign investors, often selling part of their technology in the process," he added.

A 1976 Department of Commerce study underscored the problem, Zschau noted. The study reported that in 1969, when increases in capital gains taxes began to take place, more than 200 young, high technology firms were able to raise $349 million in new invested capital in the U.S.

By 1975, however, the investment climate had deteriorated so much that not a single small, high technology company raised a dollar of new capital in public markets during the first six months of the year, the Commerce study said.

"This is particularly unfortunate since small, high technology firms create jobs at a rate nearly 70 times greater than large, mature companies," Zschau said, adding that "small, fast growing companies have a constant need for infusions of new capital for expansion."

The Wema task force chairman argued that the statistics show that had people in the U.S. been encouraged to invest today at the same rate they did in 1969, the unemployment rate in this country could be more like 3-1/2% rather than 7% or 8%.

Zschau is optimistic that the task force will be able to educate lawmakers with this information, helping them realize "that a vote for increase in capital gains taxes is actually a vote for greater unemployment and inflation."

Wema Opens Eastern Office

PALO ALTO, Calif. — Wema has opened an Eastern U.S. office to provide services to the more than 50 Wema companies in the East.

The new office, located in Amherst, N.H., will be headed by Kenneth J. Ritchie.

"The hiring of a full-time professional and opening of an Eastern office was prompted by Wema's steadily growing membership, which now includes 870 electronics companies in 33 states," Kenneth Oshman, chairman of Wema's board of directors, said.

Expansions

Datacom, Inc. has moved its manufacturing facilities to a 110,000 sq-ft plant on Old Berwick Road, Berwick, Pa.

Monolithic Systems Corp. has added 4,000 sq-ft to its corporate headquarters and production facilities at 14 Inverness Drive East, Englewood, Colo.

Computerland Corp. of San Leandro, Calif., has opened its fourth personal computing retail store in Tustin, Calif.

Digital Equipment Corp. has purchased a building and additional land in order to expand its factory operations at Maynard, Mass.

Analog Devices, Inc. will begin building a larger semiconductor division plant in Wilmington, Mass., this summer.

Computer Power Systems Corp. has moved into larger quarters in Long Beach, Calif.

Hamilton Digital Controls has purchased a building adjacent to its present location on Beachgrove Place, Utica, N.Y.

Microkit, Inc. has moved its general offices and plant to larger quarters at 11205 La Cienega Blvd. in Los Angeles.

Jacquard Systems has moved to larger quarters for manufacturing research and office work. They are located at 1639 Eleventh St., Santa Monica, Calif.

Interstate Electronics Corp. has added a 131,000 sq-ft plant to its Anaheim, Calif. facility.

Computer Sciences Corp. has completed construction of a computer center in Beltsville, Md., to be used in the company's international time-sharing service, Infonet.

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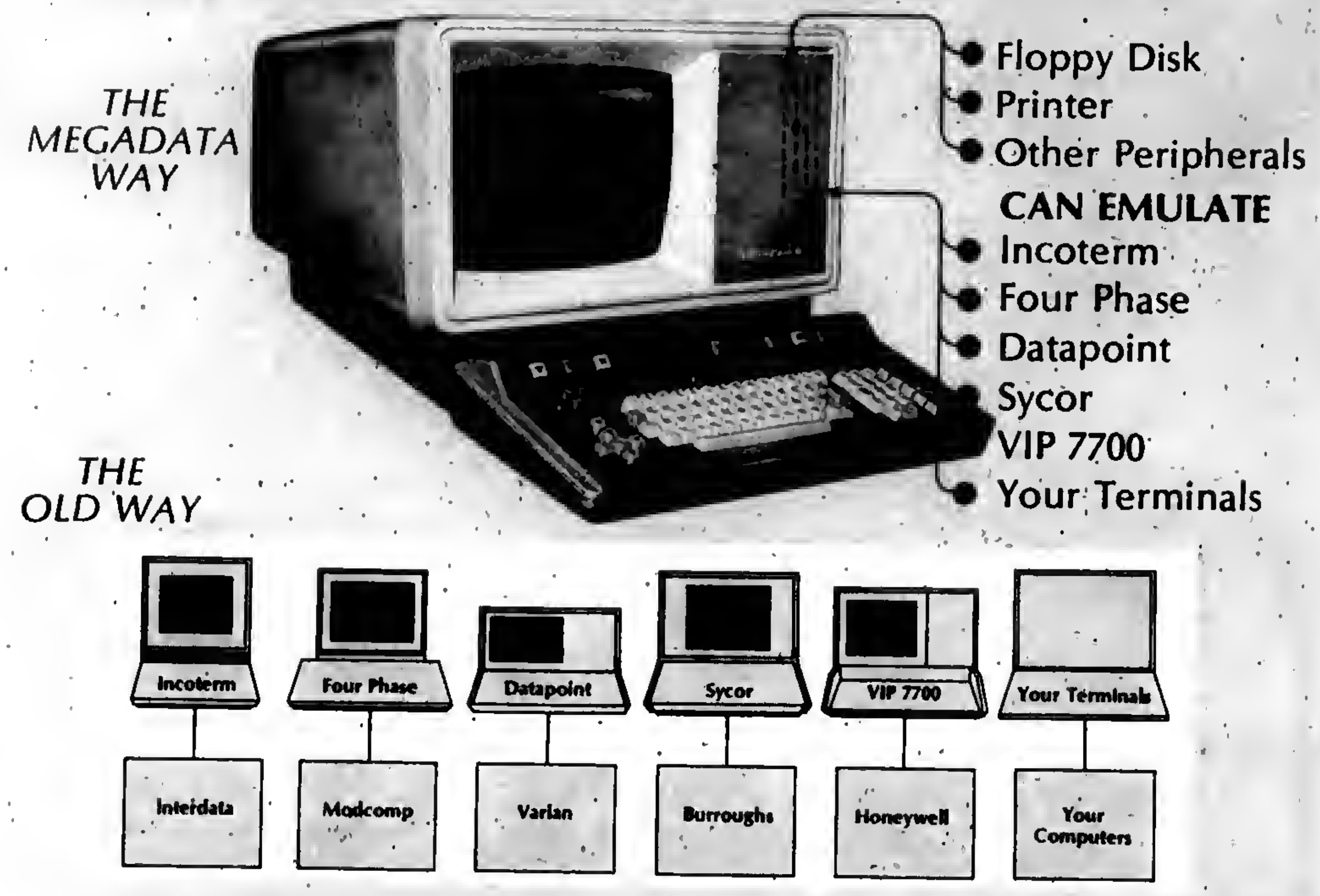

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Possible Shortages Predicted in Hobbyist Mart

WOODLAND HILLS, Calif. — Those types of computers that are sold through retail stores may be in short supply during September and October, according to Pertec Computer Corp. (PCC).

"The phenomenon of inexpensive computers, sold in retail outlets for less than $400 in kit form to as much as $15,000 for an assembled small business system, is about to experience its first burst of growth and national attention," according to J. David Callan, divisional vice-president and general manager of PCC's Microsystems Division.

About two weeks ago, PCC announced a series of manufacturing economies and some significant price reductions in its Altair line of microbased personal computing systems.

"Awareness of this type of equipment is causing a rush to open new stores. PCC, for example, currently sells through more than 50 personal computing retail stores and 30 retail outlets that specialize primarily in very small business systems, and it plans to open 50 to 100 outlets by year end. But we have more than 800 requests for store locations," Callan said.

Just the number of systems necessary to stock new stores may result in a supply-demand imbalance, he explained.

"Further, and most significant, is the lack of comparative data on our customer base. We are assuming that only a minute portion of the market has bought a system at this point.

"With the flood of national publicity and recent articles in *Business Week*, the *Los Angeles Times*, the *New York Times* and other media, a lot of people have suddenly become aware of the types of systems that are available for small business and the things they can do with them. How quickly will this market begin to purchase? That is something we have not been able to project," Callan said.

"Another element that might create shortages in certain geographic areas is also the result of the immaturity of the market," he explained. "In a mature situation, such as the automotive industry, dealers will let each other "borrow" a product: But right now the Altair computer store network is still in a formative stage.

"Stores are located too far from each other to be of more immediate assistance. And, dealers are still learning to balance their own inventories and cashflow," Callan added.

Many of the individuals who operate retail computer stores were hobbyists themselves only a year or so ago. But the store owners are now reaching the point where they can visualize a computer industry that has many parallels with the office equipment business — including its ultimate size, Callan noted.

Semi Conference To Cover Sales To East Europe

BOSTON — A day-long conference focusing on the market potential for and the problems associated with the sale of semiconductor capital equipment to the USSR and the other socialist countries of Eastern Europe has been scheduled for Sept. 16. at the Colonnade Hotel here.

The conference is designed to present facts and basic information on U.S. export control policies and programs and is being sponsored by the Semiconductor Equipment and Materials Institute (Semi).

A number of ranking government officials are scheduled to participate in the program including recently appointed Deputy Secretary of Commerce Stanley Marcuss; Dr. Maurice Mountain, director of the Office of Strategic Trade and Disclosure in the Department: of Defense; Arthur Reichenbach, compliance affairs officer in the Department of State and Joseph Dytrt, director of the Capital Goods and Production Materials Division in the Commerce Department. Roger Majak, staff consultant to the House Subcommittee on International Economic Policy, will analyze the congressional role in export control.

Industry executives participating in the sessions will include Hugh Donaghue, vice-president of Control Data Corp.; Frederick Van Veen, assistant to the president of Teradyne; William Barton, president of International Business Government Counsellors, Inc.; and Aubrey Tobey, director of marketing, GCA.

For further information contact Semi, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

DP Tools Seen Vital To Emerging Nations

TAMPA, Fla.— Education and training are the essential ingredients for developing countries to obtain long-term benefits from computerization, in the estimation of American Software and Computer Services, Inc. (ASCS).

"Only if computers are made to be tools placed directly in the hands of the developing country's people can meaningful benefits be gained," Peter Fingar of the ASCS staff said.

ASCS plans to channel a major portion of its efforts toward developing nations, Fingar said, as a result of those countries' increased awareness that computers are vital to the orderly process of advancement and industrialization.

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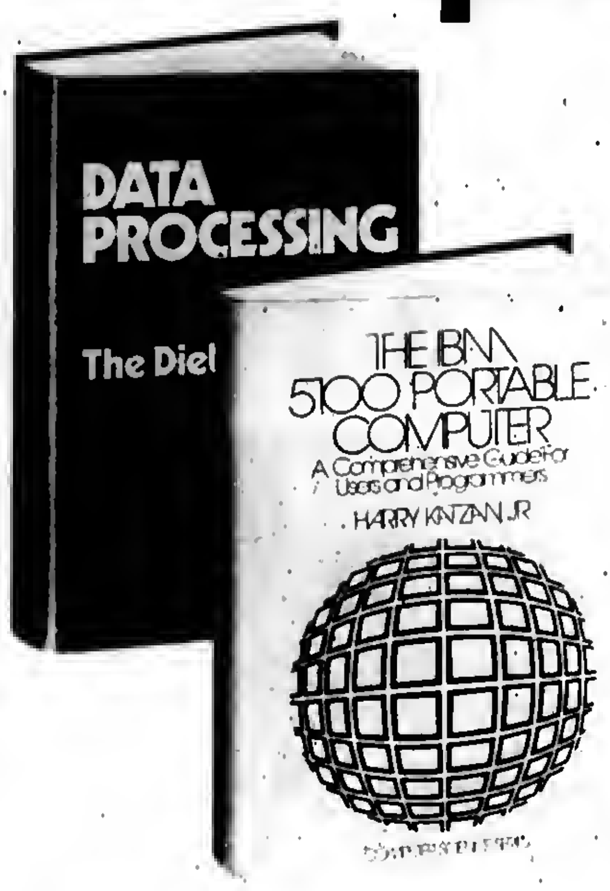
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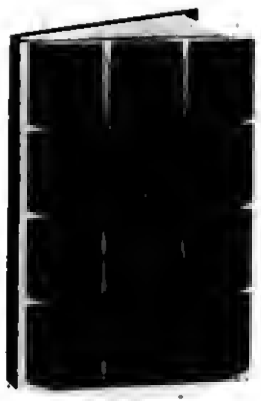

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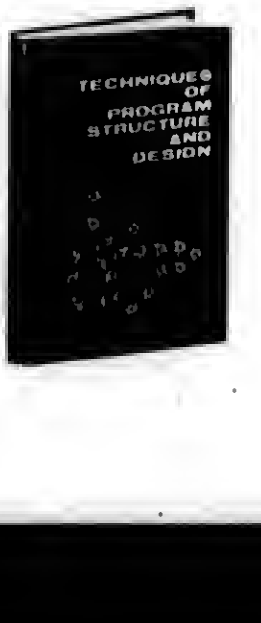

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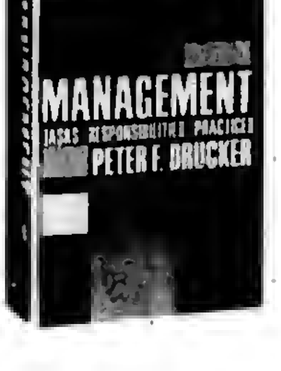

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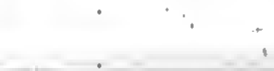

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Two Interchangeable Versions

Intel Designs 'Slaves' for 8-Bit Machines

SANTA CLARA, Calif. — The Microcomputer Division of Intel Corp. has introduced single-chip "slave" microcomputers designed to boost the processing power and control flexibility of 8-bit microprocessors such as the 8080A, 8085 and 8048.

The UPI-41 Universal Peripheral Interface (UPI) components are the first microcomputers with the architecture required to operate as a microprocessor's "intelligent slaves," Intel claimed.

They will be used primarily to interface and control printers, keyboards, displays, cassettes, analog-to-digital converters, serial data communications channels and other peripheral equipment, a spokesman said.

Intel is offering a basic UPI-41 microcomputer in two interchangeable versions, along with an input-output expander for either microcomputer. The Intel customized Model 8041 contains a mask-programmed read-only memory (ROM) for program storage.

The Model 8741 UPI was designed to expedite system development and costs $250 in single quantities. It contains an erasable programmable read-only memory (Eprom) in place of the 8041's ROM. Each 8243 I/O expander unit contains 16 I/O lines and costs $8.

The UPI-41s can store entire control algorithms that would normally consume much of the master processor's execution time and main memory space and execute them in parallel with the main program, Intel said.

Microcosm

In addition to interfacing and control functions, the UPI-41 slaves can also handle data buffering and local DP tasks such as totalizing printed lists, linearizing analog inputs, concentrating data and executing diagnostic routines, the spokesman noted.

With slaves in the system, the 8080A and 8048 single-chip microcomputer or other master can issue commands, transfer data at its convenience and continue executing its main programs, the firm added.

Software development will be simplified since control and overhead routines ordinarily interlaced with main programs can be isolated to UPI-41 modules, according to Intel.

Unlike previous intelligent peripheral chips, the UPI-41 components are fully user-programmable instead of being software-adaptable to particular kinds of applications, Intel said.

Each single-chip slave contains a complete microprocessor to communicate asynchronously with multiple slaves, the firm said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Analyzer Debuts

SCOTTSDALE, Ariz. — Yucca International, Inc.'s Yuccalyzer Model YA-20 is a real-time, noninterfering microprocessor logic analyzer that costs $875.

The YA-20 is structured to debug systems using 8-bit data bus structures such as the Motorola 6800 and Intel 8080-type micros.

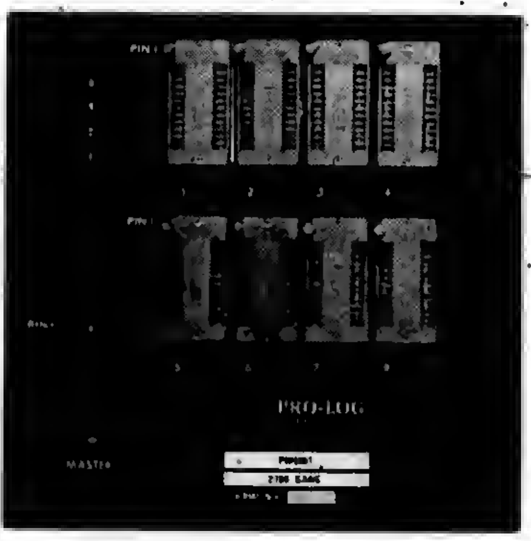
Up to 128 30-bit data words can be trapped and stored at any address in the program, Yucca said. Instructions can be read a data word at a time on hexadecimal LED displays; user inputs and MPU status are reported by LED indicators.

Probes are provided for either the 6800 or 8080 at no cost; others are available on order.

Yucca International is at 14415 N. Scottsdale Road, Scottsdale, Ariz. 85260.

Pro-Log Has Unit For 2708 Types

MONTEREY, Calif. — Pro-Log Corp. is offering a gang personality module it said is able to program up to eight 2708-type 8K MOS erasable programmable read-only memories (Eprom) simultaneously in less than three minutes.



PM 9051 Gang Module

The PM 9051 can program, duplicate, list and verify 2708-type Eproms from Advanced Micro Devices, Electronic Arrays, Intel, Intersil, Motorola, National Semiconductor, Signetics and Texas Instruments, according to Pro-Log.

The PM 9051 gang module works with both Pro-Log's Series 90 programmable read-only memory (Prom) Programmer and Series 92 Prom programmer/duplicator control units.

With the PM 9051 priced at $895, users can do gang programming with a Series 90 for $2,695 and gang duplicating with a Series 92 for $1,890, Pro-Log said.

The PM 9051 modules are available off-the-shelf from the firm at 2411 Garden Road, Monterey, Calif. 93940.

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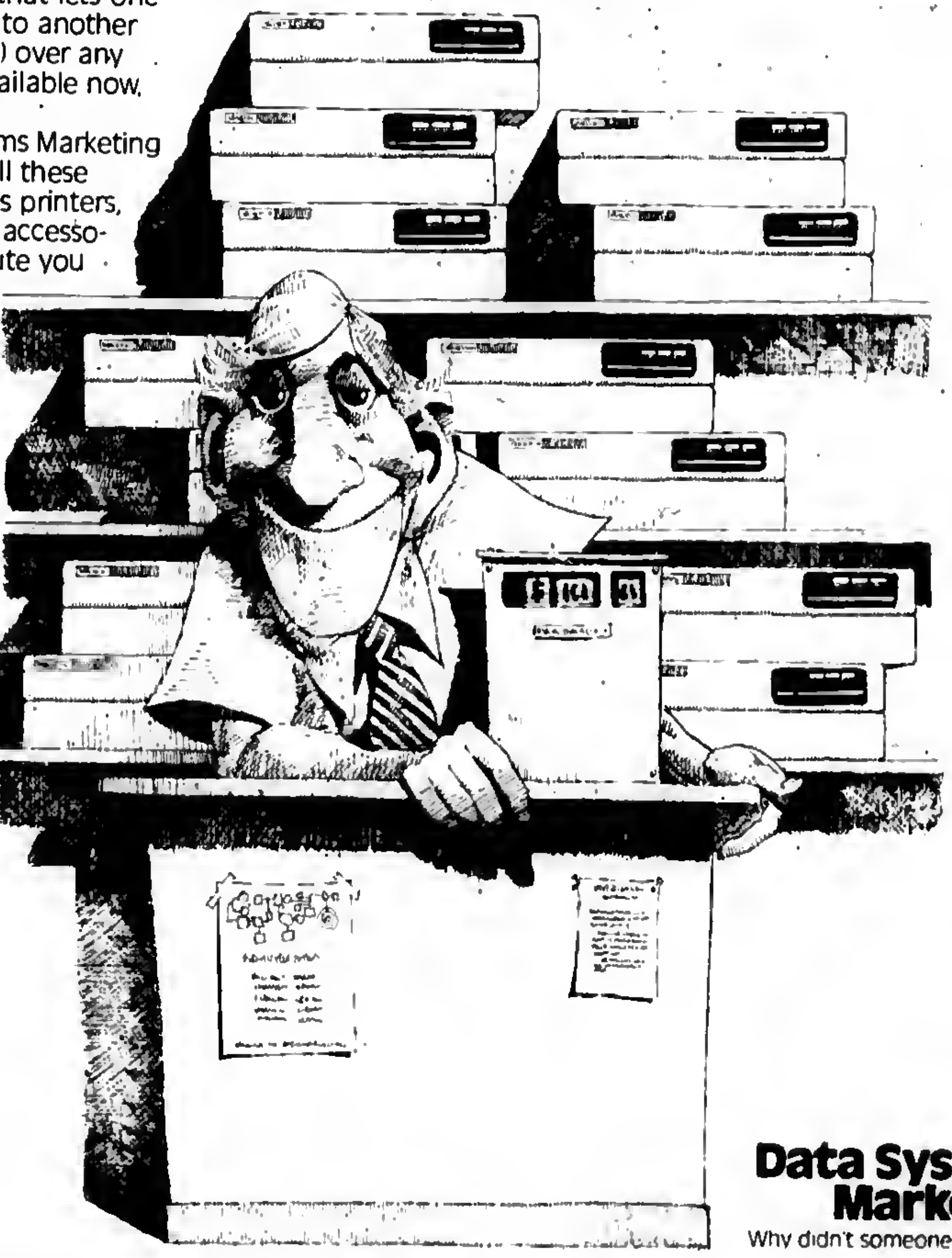

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Fujitsu Unveils Two Disk Drives

SANTA CLARA, Calif. — Fujitsu America, Inc. has unveiled two disk drives, the M2201 with a dual-disk removable cartridge and the M2251, which features Winchester technology.

Prices for the M2201 are $3,900 in quantities of 100 and $215 for the cartridge. The M2251 in capacities of 12.5M- to 50M bytes costs $2,650 to $3,540 in quantities of 100. Deliveries are scheduled for early 1978.

The drives can be intermixed under the same controller, Fujitsu said.

The M2201 is a front-loading drive with two disks within the removable cartridge which contain up to 50M bytes unformatted and 40M bytes formatted.

The removable disk contains four times as much data as other single-disk methods and requires no nonremovable media, the firm claimed.

Access times are 6 msec track-to-track and 30 msec average for the M2201, Fujitsu said. The M2201 uses a track following servo system.

The M2251's access times are 10 msec track-to-track and 40 msec average, the firm said from 2945 Oakmead Village Court, Santa Clara, Calif. 95051.

OEM Products

40-Pin Controller Out

PALO ALTO, Calif. — Cybernetic Micro Systems has introduced a 40-pin LSI universal printer controller, the Model CY 480, which it said will control and interface any standard 5 by 7 dot matrix printer having a print speed up to 200 char./sec.

The controller operates from a single +5V power supply, according to a spokesman. It will interface a printer with any microcomputer or minicomputer system through standard 8-bit ports and accept either RS-232C or parallel Ascii input from the host system's data channel, he said.

Features include a 5 by 7 dot matrix character generator a full upper/lower case Ascii 96-character and font.

In lots of one to 49, the CY 480 is priced at $92. In quantities of 5,000 and up, it costs $30 from 2460 Embarcadero Way, Palo Alto, Calif. 94303.

Raycorder Introduced

MIDDLETOWN, Conn. — Raymond Engineering, Inc.'s Raycorder Model 6413 was designed for use with 1/4-in. data cartridges.

The unit is fully Ansi-Ecma-compatible; modular packaging provides a variety of configurations for OEM requirements, the firm said.

Standard electronics provide automatic search to load point on command and external program capability for drive select codes when up to four drives are operated from a single controller, according to a spokesman.

Data format is serial NRZ at 48 kbit/sec. Block detection allows block count/search operation.

In single quantities, the unit costs $1,250 with a serial interface and $1,400 with a parallel interface from 217 Smith St., Middletown, Conn. 06457.

Printer Gets Controller

SHELTON, Conn. — Practical Automation, Inc. has added an integral microprocessor controller to its 80- to 96-column text/data printer, which prints on adding machine rolls, impact-sensitive paper or fanfold forms and labels, the firm said.

The DMPT-6 printer controller provides selectable interface functions; parallel Ascii, RS-232-1-Loop and switchable transmission rates from 110- to 1,200 bit/sec.

All needle drivers, character generation and required diagnostic routines are also provided by the microprocessor controller, it added.

The needle printer forms 7 by 5 dot matrix characters over the Ascii 63-character set. Printing speeds range up to 110 char./sec and the price is $472 in single quantities.

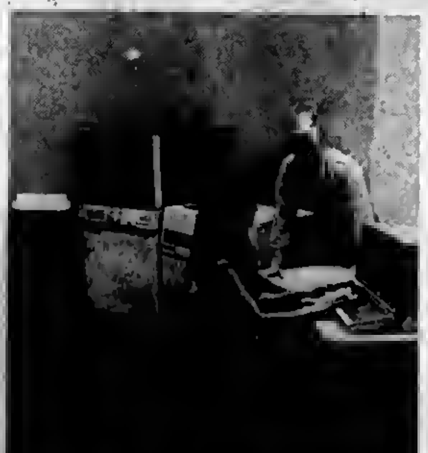
Practical Automation is at Trap Falls Road, Shelton, Conn. 06484.

SYSTEM 3300

Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.

The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as *spooling*, *HASP* and *RJE*.

With the 1330, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four – 10 Mb. drives) foreground and background editing and bisync communications.


The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

Univac Integrating MCO

BLUE BELL, Pa. — Univac plans to integrate its new Minicomputer Operations (MCO) into the company organization with a program designed to give "optimum continuity in the acquired operation as well as focus attention on this fast-growth sector of the computer industry."

Univac recently acquired Varian Data Systems. Manufacturing and development of additional hardware and software products will continue to be centered in Irvine, Calif., according to Jerome J. Meyer, vice-president and general manager of Univac MCO.

Meyer noted that expanded development, marketing, production and support plans are being implemented to serve both the traditional mini applications and Univac distributed DP applications.

Meyer pointed out that the development of the MCO product bases — in particular the Series V77 — will be especially directed toward industry sectors with applications in small to large system environments.

T-Bar Head Warns

Communications in Danger

NEW YORK — "The rapid expansion of data communications offers many pontential benefits for our society and almost as many serious problems. In fact, one senses the similarities betwen the present energy crisis and the coming communications crisis," A. Henry Morgan, president of T-Bar, Inc. recently told members of the New York Society of Security Analysts.

"Unfortunately, whereas some people recognized the onset of the current energy crisis as long as 20 years ago," Morgan said, "an awareness of an imminent communications crisis is only seven or eight years old."

In many ways, sustaining uninterrupted data communications has become as vital as sustaining the availability of electrical energy. In one way, it is even more critical, for in data communications "the content of the transfer has its own importance, unlike the substance transferred in an electrical energy system," he noted.

The importance of this data is society's ever-increasing dependence on the computer that provides the services which have become virtual necessities for business and individuals, Morgan said.

Without uninterrupted data communications and data processing, "we would not have available to us the facilities that help us to control disease, disseminate aids, increase agricultural productivity, help control floods or to make provision for world wide credit cards, instantaneous hotel, airline and car reservations or the ready transfer of funds through banks, stock exchanges or other financial institutions," he said.

"Future developments in communications, made possible by increased use of newer technolgies, are expected to even transform the way Americans conduct their lives, at the same time perhaps raising serious problems.

"These transformations will effect how they send and receive messages, pay their bills, talk to their politicians, get their pay, obtain medical care and receive entertainment, news and even their education.

"There is, as well, the possibility of invasion of privacy should the federal government opt for a single clearinghouse for financial transactions. And consider the government's increasing reliance on these technologies for making evaluations that affect defense, taxes, welfare, aid to cities — virtually every area of our lives," Morgan pointed out.

Orders & Installations

Utah County has installed a Burroughs B1726 system and an on-line terminal network of TU 1700 terminals and TD 830 systems in the county building in Provo, Utah.

J.E. Sirrine, engineers and architects, has ordered a Honeywell Model 66/05 large-scale system valued at $800,000.

The Southeast Banking Corp., Miami has ordered a network for credit card and check cashing authorization services from National Data Corp.

The State Bank of Apopka, Fla. has installed an on-line inquiry system from Florida Software Services.

The Revenue Department of the Commonwealth of Pennsylvania has ordered eight Key-Edit 1000 systems, including 190 data terminals, from Consolidated Computer International, Inc.

Lotspeich Co., a Miami-based construction and building supply company, has installed a Geigel & Williams Systems, Inc. turnkey system, including an on-line distribution inventory system.

The Computer Co. of Richmond, Va., has installed a 1.5M-byte 370/Stor 155 add-on memory system from Cambridge Memories, Inc.

The Sumitomo Bank of California has ordered 100 NCR Corp. 279 financial teller terminals for use in the bank's on-line financial system network.

The Wells Fargo Bank of San Francisco has ordered Incoterm Corp. Series 7700 automated teller machines, supporting equipment and software.

The Commodities Exchange Center of New York has installed Trans-Lux Corp. ticker terminals as hard-copy, last-sale tickers for its news and quotation reporting system.

Clay Bernard Systems International of Tulsa has ordered three systems from Tandem Computers, Inc. for distributive process control applications.

Dallas County Community College District has installed the first of 147 APL CRT terminals from Hewlett-Packard.

The National Bank of South Carolina, headquartered in Sumter, has ordered a NCR Corp. Criterion 8550 system and on-line teller terminals.

Demand Data, Inc. a Lakeland, Fla., DP firm has ordered a Data General Corp. C-330 Eclipse System.

Pepperdine University of Malibu, Calif., has installed a Univac 90/60 to process all administrative and academic DP applications for the university.

Rite-Aid Corp., a national retail drug chain, has ordered 600 electronic cash registers worth approximately $1 million from Data Terminal System, Inc.

National Airlines, Inc. of Miami has ordered a Dual CC-80 programmable front-end processor system from Computer Communications, Inc.

Adams Millis Corp. of High Point, N.C., has ordered a System 7000 from Inforex, Inc. to handle its inventory requirements. Adams Millis is a producer of hosiery products.

St. Joseph's Hospital of Parkersburg, W. Va., has ordered a NCR Corp. Medical Information and Communications System.

Hofstra University, Hempstead, N.Y., has installed a Univac 90/60 system, replacing its Univac 70/7 system.

The *Morning News* of Dallas has ordered a Digital Equipment Corp. TMS-11 text management system to be used in the newsroom for automatic capture of wire copy, remote bureau input and local newswriting and editing.

Boston College has ordered a Digital Equipment Corp. PDP-11/70 system to support academic and research programs.

United Feature Syndicate, Inc. of New York has ordered a minimum of 2,500 microcomputer systems from EDC Corp.

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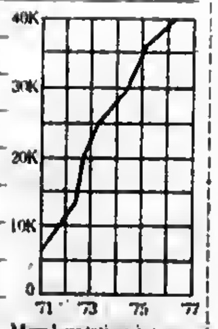

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'New' Company Has Advantage: Experience

ESCONDIDO, Calif. — There's a "new" company here that has an unusual advantage over the typical start-up firm: it has been building its product, a computer data terminal, for half a dozen years.

In fact, the company has shipped more than 1,000 terminals. To the outside world, however, the identity of Design 100 Corp. has been obscured by the fact the company was a captive manufacturing facility for other firms who sold the product under their own names.

More recently, Design 100 has been "reborn" with a new family of terminals that incorporate advanced technology in microelectronics, printing mechanisms, software and packaging. With a highly competitive product and an infusion of private capital, the company is now plunging into marketing and sales, with primary focus on distributors who sell to managers of computer communications and word processing systems.

"Our approach is exceptionally simple," according to Carl Anderson, president of Design 100 Corp. "We will emphasize the strengths of our products to sophisticated customers that understand the advantages of our Cleantype terminals."

In naming the new product line Cleantype, the company is emphasizing one of its features — an easy-to-read, high-quality printout, he said.

"This is a long-standing sore point with computer users who might spend a million dollars or more for a computer system that produces copy which is difficult to ready by any than a practiced eye," Anderson explained.

Design 100 products incorporate the bidirectional daisywheel printer mechanism manufactured by Qume Corp.

The quality of printing is but one competitive feature, according to David Crellen, vice-president of engineering.

"We will be selling versatility in today's multiuse business environment," he said. "All products in the Cleantype series are desktop communications consoles (up to 1,200 bit/sec), with programmable microprocessor, choice of communication codes, interchangeable type fonts, selectable pitch, plotting capability (5,760 points per square inch) and a 256-character print buffer."

A Cleantype terminal can be used for local data entry and editing, as an interactive terminal, as an electronic typewriter in word processing systems and as a plotter for producing graphic exhibits. Design 100 will also offer custom software development services for customers with nonstandard application requirements, he said.

At present, three standard models are being produced, Crellen noted, with differences based on print speeds and type of printer wheel. The Cleantype 45 has a 96-character plastic wheel that prints at 45 char./sec, the Model 55 has the same wheel, but prints at 55 char./sec and the Model 40X features an 88-character metal wheel that prints at 40 char./sec.

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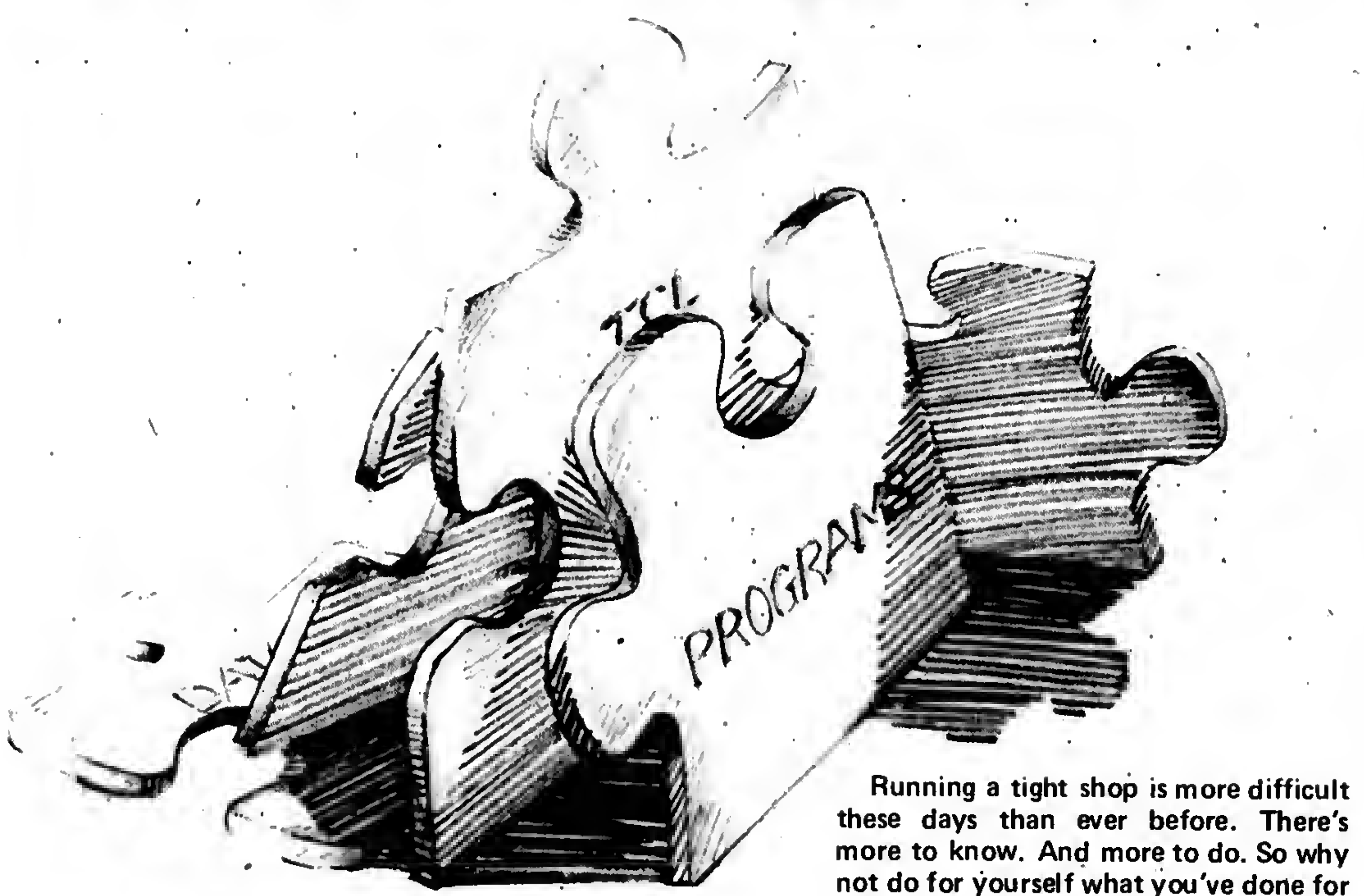

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Merrill Lynch, NCSS Offering Business Service

NEW YORK — Merrill Lynch Economics, Inc. and National CSS, Inc. (NCSS) have announced the availability of economic forecasting and modeling services — a joint effort based upon the Merrill Lynch Economics Macro-Econometric Model and implemented through NCSS' computer services.

"We have been working for a long time to develop a large-scale econometric model of the U.S. that was detailed enough — at the industry level — to provide our clients with a practical analytical tool," according to Dr. Albert H. Cox Jr., chief economist and president of Merrill Lynch Economics.

"Today we have such a model," Cox continued, "a practical tool, tied to the activity in 81 different industries, for forecasting the national economy and its sectors. An example is the automobile component of final demand which is built up from a detailed 80-equation model of the automobile industry."

At a joint news conference, Robert E. Weissman, NCSS president, added, "It's our job to make this important new approach to business forecasting information available in the right places, at the right time. To do this, National CSS provides data communications designed to accept and deliver forecasting information at any location.

"We also supply the applications software to translate the data and deliver solutions in a form that makes business sense. And we provide the computers which deliver the power to drive the entire system."

The core of the Macro-Econometric Model's real sector comprises 53 indexes of industrial production. The model generates forecasts of employee compensation in 11 business and government categories.

In the pricing sector, nearly 50 wholesale price indexes are modeled. These, in turn, become the cost base for nearly 30 consumer price indexes.

According to Cox and Weissman, the industry detail of this econometric forecasting system signals a major step forward in the provision of information for businesses across the country.

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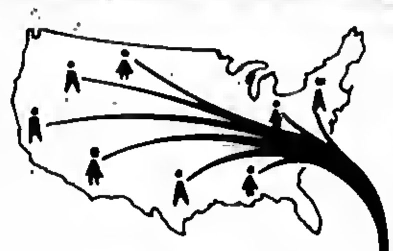

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How: Call your nearest Source Edp office today.

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Should you attend the Computer Career Conference?
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Meet your Source Edp Atlantic Coast Conference Directors.

Richard E. Gardner is Director of the Boston office. Rich, who holds a B.S. degree in Mechanical Engineering from Newark College of Engineering, has been in the computer field since 1968. Prior to joining Source Edp, he was associated with IBM for eight years in a variety of marketing and account management positions.

Martin Grolnic is Director of the Washington, D.C. office. Marty, who holds a B.S. degree from Temple University, has been involved in computing since 1959. Prior to joining Source Edp, he was District Manager for ASI; Marketing Director for Digidata Inc. and Regional Manager for Leasco Response, Inc. Earlier experience includes six years with RCA Corporation in systems development, systems management and product planning.

Steven M. Joffe is Director of the Union office. Steve, who holds a B.S. from Queens College and an M.S. in Management Science from Stevens Institute, has been active in data processing since 1965. Prior to joining Source Edp, he was Project Administrator and Senior Staff member with Dun & Bradstreet, Inc. for nearly four years. Earlier positions were Senior Analyst with Joseph E. Seagram & Sons, Senior Programmer with Allied Chemical, Operations Research Analyst with General Foods and Systems Analyst with Prentice-Hall.

Thomas C. Johnston is Director of the Hartford office. Tom, who holds a B.S. degree in Business Administration from Western Michigan University, has been in data processing since 1967. Prior to joining Source Edp, he served as a Marketing Account Manager for Honeywell Information Systems and Systems Analyst and Sales Representative for Sperry Univac.

Daniel S. Mickel is Director of the Stamford office. Dan, who holds a B.A. degree from the University of Rochester, has been associated with computing since 1957. Prior to joining Source Edp, he served as Director of MIS for the City of New York. Earlier, he was associated with Mutual of New York in various positions including Assistant Director of Data Processing, Director of Electronics, and Systems Associate.

William R. Penberthy is Director of the Philadelphia office. Bill, who majored in Electrical Engineering, has been associated with data processing since 1957. Prior to joining Source Edp, he was involved in his own computer consulting firm for nearly two years. Earlier positions included Data Processing Manager for the city of Flint, Michigan and Montgomery Ward. He also worked as a Systems Engineer for NCR and IBM.

Michael D. Taylor is Director of the Atlanta office. Mike, who holds B.S.E.E. and M.S.E.E. degrees from the University of Texas, has been involved in computing and electronics since 1968. Prior to joining Source Edp, he was employed as a Systems Engineer for Electronic Data Systems for nearly two years. Earlier experience was as a Development Engineer with Schlumberger Well Services and with Radiation Incorporated.

Gary L. Weiss is Director of the Wellesley office. Gary, who holds a B.S. degree in Marketing from the University of Arizona, has been involved in the computing field since 1968. Prior to joining Source Edp, Gary was Boston Branch Manager for Periphonics. His initial experience was gained at IBM for six years as an Account Representative and National Account Team Leader.

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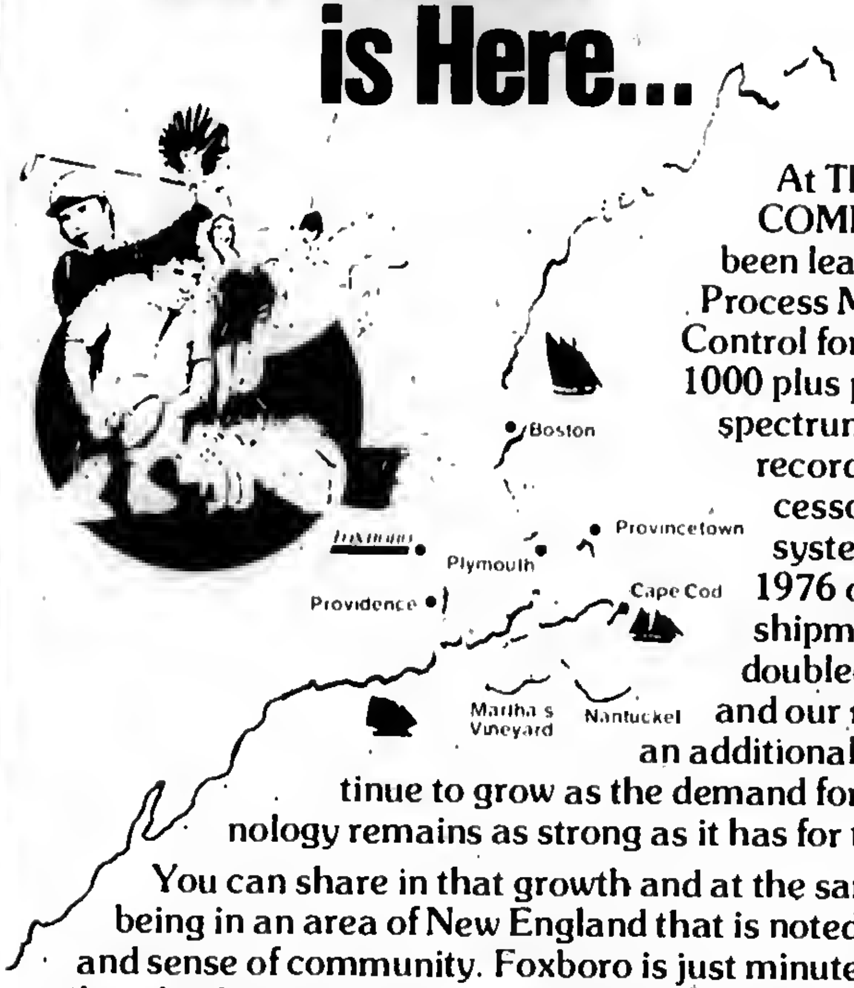

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You can share in that growth and at the same time enjoy being in an area of New England that is noted for its friendliness and sense of community. Foxboro is just minutes away from the cultural, educational and entertainment centers of Boston and Providence and the limitless recreational opportunities on Cape Cod and the Islands.

...in Real Time Software

Senior Software Development Engineer

Will program software implementable functions on dedicated instrument devices. These devices typically require programming of a commercial microprocessor. Programs may reside in either ROM or RAM. This person to be involved from conceptual system design through to a finished product. Requires at least 4 years' experience programming small computer systems (micro experience helpful).

Senior Software Design Engineer

Will be responsible for supervision of programmers engaged in the design and implementation of software for microprocessor based control products. Will participate in project definition, feasibility studies, design reviews. Requires at least 5 years' mini and micro programming experience with real time control systems.

Senior Software Design Engineer

Key person responsible for the design and implementation of software for a microprocessor based digital control system. Will participate in project definition, feasibility studies, design reviews, trade-off studies, etc. Most programming done in assembly language. Degree with at least 3 years' experience required.

Senior Software Design Engineer

Will be project programmer for general purpose microprocessor based man-machine interface. Will participate in evaluation of functions, integration with other products, and will do detailed design and implementation of MMI Firmware programs. Degree with at least 3 years' experience required.

Scientific Programmer

You will assist the Systems engineer in the estimation, design and implementation of application software and work as project programmer on applied systems. BS in Engineering, the sciences or equivalent and at least 2 years' experience in real time application programming with Fortran experience required.

Simulation Software Engineer

Will be responsible for simulation involving one or more of the following areas: computer system simulation, continuous simulation of process control systems, discrete simulation of manufacturing processes.

Degree required and at least 1 year simulation and analysis of complex systems experience. Familiarity with GPSS or one or more of the major simulation languages and CSMP and FORTRAN programming experience. Knowledge of process control theory desirable.

Please send resume, including salary history, to Mike Boyd, Dept. 129-CW, The Foxboro Company, 38 Neponset Avenue, Foxboro, MA 02035. Foxboro is an equal opportunity employer, M/F.

FOXBORO

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HOWARD ORGANIZATION INTERNATIONAL LTD., a leading European **E.D.P. SERVICE ORGANIZATION**, has immediate openings for senior systems designers with specialist experience in real-time communications (ideally in packet switching).

Successful applicants will be assigned to Belgium for a period of 2 to 5 years and will be initially involved in a packet switching network for the dutch market.

By European standards incomes will be very attractive including overseas allowances. Our preference is for designer with E.E.C. passport status and interviews will take place during September.

Please send your resume and income expectations to:
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HOWARD ORGANIZATION INTERNATIONAL LTD.
Employment Business Section
Manor Way, Borehamwood
Hertfordshire, WD6 1LE England

SYSTEMS PROGRAMMERS

Technical Services at Indiana University/Purdue University at Indianapolis has challenging career opportunities at all levels for systems programmers with experience on DEC-10's and/or 370's.

IBM 370 SYSTEMS PROGRAMMERS

Positions exist in two areas:

Operating and Telecommunications Systems — B.S. and at least one year experience with TOPS-10. Knowledge of operating system internals a must. Familiarity with performance measurement and schedulers highly desirable.

Systems Software — B.S. and at least one year experience with editors, loaders, compilers, and other systems programs. This position will also support similar requirements on a CDC 6600 and Cyber 172.

DEC-10 SYSTEMS PROGRAMMERS

A challenging position as lead systems programmer is open to the right individual with at least two years' experience with 360 or 370 operating systems, at least one year of which must be in DOS/VS or OS/VS. This individual will have full responsibility fpr operating system software on a 360/44 running DOS and on a 370/125. The 370/125 will be used for academic instruction in operating system theory and construction and will run DOS/VS, OS/VS1, and VM. It will also act as an RJE station to the DEC 1090 and a 370/158 running MVS. This position thus offers considerable opportunity for growth and technical challenge.

IUPUI has a student enrollment of 22,000 and combines the strengths of the curricula of two BIG TEN SCHOOLS and the largest school of medicine in the country. Computer equipment on campus supported by Technical Services includes IBM 360/44 and 370/125 systems and a DEC 1090. In addition, the group provides support and has access to a 370/158, CDC 6600, and CYBER 172 at our Bloomington campus, as well as a large number of minis in use for research at Indianapolis.

Fringe benefits are excellent. Salary is commensurate with experience.

Please submit resume to: Bill Schilk, Personnel Division, Indiana University/Purdue University at Indianapolis, 1100 W. Michigan St., Indianapolis, IN 46202, An Equal Opportunity Employer.

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You will handle an extensive line of intelligent terminals, graphic systems, plotters and related peripherals to both new and established customers. Positions are currently available, to be based in St. Louis, Minneapolis/St. Paul, Chicago, and in San Diego and Santa Clara, California.

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For immediate consideration forward your detailed resume in confidence to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, CA 95051. Or call the above toll free number and leave the requested information with one of our special operators and we will get back to you very soon. An equal opportunity employer M/F/H.

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The Minerals Department of Exxon Company, U.S.A. has openings for Systems Analysts with expertise in computer applications in mining with the following qualifications:

- Degree in mining engineering or geology preferred
- Minimum of three years experience
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- Knowledge of JCL, OS/MVS, and TSO desirable
- Background in ore modeling, geostatistics and/or operations research is a plus

Excellent benefits package and opportunity for advancement.

Reply to:

Recruitment Coordinator
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P. O. Box 2180
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(609) 667-4488

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We are seeking Systems Programmers with TP background to work in a rapidly growing TP environment. We are a 370-168/158 MVS shop with CICS, TSO and TCAM applications.

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Do you consider yourself a thorough professional in any of the following:

System design and architecture, leader of large system programming teams, programmer in large scale 370 MVS environment? Do you accept the concepts of hard specifications, deadlines, and tight cost controls? You may find our environment challenging (PL/1 is our language).

Please submit an up-to-date resume including salary requirements to:

Mrs. Linda Heldenis
NORTHEAST UTILITIES
P.O. BOX 270, HARTFORD, CONNECTICUT 06101

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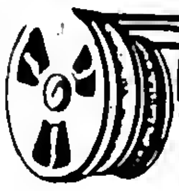

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Computer Data Systems, Inc.
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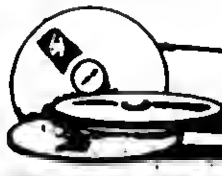

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BSEE with minimum 4 to 6 yeers' experience or equivelent in development of hardwere systems using micro computers on discrete controllers. Experience in srees such es disc controllers or other mess storege system controllers is preferable.

SENIOR DESIGN ENGINEER - FIRMWARE

BSEE or BS in Computer Science with 2 to 3 years' experience in software development of reel time mini-micro computer systeme. Experience with I/O drivers for devices such es cessettes, msgnetic tapes, floppy disks or diske is prefersble

FIRMWARE ENGINEER - DIAGNOSTICS

Minimum 2 years' experiance in hardware design, progremming in assembly lenguege of micro computers. Diegnostics programming a definite plus. BSEE or equivelent desired.

SENIOR ENGINEER - ANALOG

BSEE a must, MSEE desireble. Five years' experience in enalog circuit design, preferably in magnetic recording and/or servo mechanisms.

SENIOR MECHANICAL ENGINEER

A BSME is reouired. MSME highly desireble, plus et leest 7 yeers' experience in the design of products involving small, high reliability mechanisms, preferably in the printer field or releted to computer peripherals. Your background should include leadership responsibility on development projects.

INDUSTRIAL ENGINEER

Minimum 2 yeers' experience with printed circuit boerd assembly mathods a must, electromechenical assembly axperienca e definite plus; should be experienced in processing and standards. A degree in E.E. or equivelent experience is needed.

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Experience es a Programmer in COBOL or Assembler required. Micro/Mini end/or programmeble (intelligent) terminel use or support experience desirable, plus exposure to data entry applicetions and marketing customer support. Communications with bi-sync and on-line background especially helpful. Bachelor's degree desired.

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Minimum of 3 yeers' experience successfully selling terminals, peripherels, or small systems and general knowledge of DP epplications, including communications is raquired. Candidetes must heve a proven track record of seles performance over quota. Responsibilities include sales of a complete line of computer products and support of existing customers.

USER LANGUAGE DEVELOPMENT

Participate in the development of COBOL/BASIC/RPG II compilers and essociated interpreters for Sycor 400 series equipment. Responsibilities include language development, design and implementation. B.S. or M.S. in Computer Science or related field with relevent course work and/or experience. Knowledge of block structured language and one of COBOL/BASIC/RPG II. Machine leval programming, especially 8080 or other microprocessor would be e plus.

SYSTEMS LANGUAGE DEVELOPMENT

Participate in development of Sycor's systems implementation language, SYCLOPS. Responsibilities include language development, compiler development, code generation for new microprocessors and application of source optimization techniques. B.S. or M.S. in Computer Science or related field with relevant course work and/or experience. Knowledge of block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

DBMS DEVELOPMENT

Participate in the development of a generalized DBMS for Sycor systams, using state of the art technique. B.S. or M.S. in Computer Science or related field with emphasis on data structures and DBMS. Knowledge of a block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

If unable to see us during the WESCON show interviews, please send your resums in confidence to:

Gopi R. Jindal, Ph.D., Manager Corporate Employment & Staffing, 100 Phoenix Drive, Ann Arbor, Mich. 48104 (313) 995-1156.

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Experience with Systems for construction project controls is a plus.

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Systems design at both conceptual and detail level. Function as a project leader in the development of major EDP systems and will interface with all levels of management. 3 to 5 years' experience with large scale systems.

Programmer Analyst

Analyze job requirements, prepare specifications, prepare time and work cost estimates for systems development work. May function as a programmer and participate in programming activities. 2 to 3 years' experience with large scale systems.

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Daniel Building
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Requires detail design and implementation of hierarchical data base systems to support engineering, production planning and control, materials management, shop floor control, and factory automation.

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Software System Designer

M.S. in Computer Science or Engineering and 5 years' experience in design of software systems for real-time and interactive systems.

Programmers

B.S. in Computer Science, Math, Physics, Engineering or Business and programming experience with higher order languages such as Fortran, COBOL, PASCAL, or PL/1. Both scientific, business and real-time programmers are needed. Openings for these positions are in Dallas, Texas.

Minicomputer Programmers

Requires experience on 16 bit mini's using Fortran or Assembly languages working on data base management, communications, factory automation, interactive graphics and computer aided design.

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Experience in the design, analysis end implementation of manufacturing systems. Excellent communicetion skills with current or previous expertise in COBOL progremming using 370 DOS/VS and TDTAL. College desirable.

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Employees will enjoy excellent salary end top working conditions with a commercial employer Fully paid life, hospital end medical plan for employees end dependents, generous relocation ellowance

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VERMONT

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PROGRAMMER/ANALYST

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Software Prog (2-5 yrs)	$18-23K	Scientific Programmers (mini's, etc.)	$16-23K

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We have an excellent opportunity for a qualified individual in our IBM 370 Data Center in Houston, Texas.

You will be responsible for the implementation and maintenance of the OS/VS1 and VM Operating System, Data Communications Software and for the evaluation and selection of software enhancement and performance measuring packages.

This is a significant position which will allow you to participate in the technical design review for all new applications development. You must be able to provide technical support to the Systems/Programming and Operations Staff.

Required Experience:

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IBM	ANS COBOL Language
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Employment Manager
E-Systems, Inc.
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Dallas, TX 75222

SOLID STATE TECHNOLOGY RESEARCH PLANNING

A major east coast computer manufacturer is searching for an individual with a Ph.D. and research background in one or more areas of solid state technology, and with several years experience in device and chip design and fabrication of computer related circuits, to fill a key management level staff position in a growing research organization.

Major responsibilities will be to identify research needs in the area of solid-state technology related to commercial mainframe computer systems, and create, initiate and monitor multi-year research programs which will provide new technologies for use in developing future computer systems. Will also help define in-house integrated circuit production needs and facilities requirements.

Candidates for this position will have a solid commitment to the need for well planned, innovative research, and will be ready to assume full responsibility for the planning and monitoring of research in this critical area of computer technology.

Interested candidates, send resume, in confidence, including salary requirements to

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Digital's Field Headquarters Organization was the answer for Peter, Collins, Sue, and Bob...

and it could be the answer for you.

If your career growth isn't progressing as rapidly as you'd expected and you're beginning to find that your projects aren't as exciting as they once were, consider the experiences of Peter, Collins, Sue, and Bob.

They reacted to similar points in their own careers by critically re-evaluating their goals and where they could achieve them. And what Peter, Collins, Sue, and Bob all discovered were the opportunities for growth, advancement, and responsibility, within Digital's Field Headquarters Organization.

Their standards were very high when they searched for a place where they could have a more meaningful, productive, and rewarding career. They chose our Field Headquarters Organization. Like many other talented and ambitious professionals, Peter, Collins, Sue and Bob found our environment encourages initiative, increased responsibility and advancement while working at the vanguard of computer technology.

Corporate Field Service is responsible for all customer support services, giving you a unique opportunity for exploration and involvement across the entire spectrum of our technical operations. You'll have a chance to be right on top of state-of-the-art developments in a variety of hardware/software support areas (Memory, Peripherals, Power Supplies, and Communications) as well as the design, maintenance and installation of small, medium and large scale operating systems.

You can also utilize your communications skills and knowledge of operating systems and compilers. Or you could help develop A/V courses and instruct hardware/software courses for new systems and products. And because your contributions impact on a corporate level, you'll have unusually high visibility within one of the world's leaders in computer development and manufacture.

Our various groups within the Field Headquarters Organization — Product Support, Software Service, Field Service Logistics/Operations Development, Educational Services and Technical Documentation — offer you a wide range of virtually unlimited opportunities.

Product Support

Our organization is interested in pursuing exceptional candidates with a strong desire to grow and ability to be creative. We are looking for people with a combination of technical computer background, business skills and some experience in dealing with hardward oriented field related problems. Several positions are currently available for hardware professionals including Project Managers with good technical and business skills and Support Engineers with experience in disc, mag tape, data communications, terminals, etc.

Contact: Jon Zion

Software Service

At Digital, service is a major business. Commitment to providing excellent service makes this a key group. They provide highly qualified technical expertise to back up the Field Software Service Organization in the solution of both product oriented and customer oriented software problems.

You can be a Software Specialist if you have done one of the following: customer or vendor software support, if you are a good Systems Programmer with a solid knowledge of operating systems, compilers or device drivers, have installed, tested or started-up software packages, or if you have distributive processing or networking experience.

If you would like the visibility of a Headquarters position, we can offer you a managerial or technical dual-path career opportunity.

Contact: Dale Welch.

Field Service: Logistics/Operations Development

Responsible for monitoring inventory to over 150 Digital offices throughout the United States and Canada, this group is seeking Clerks and Planners. It is supported by an EDP Business Group, which has several positions available for Programmers, Programmer Analysts with a background in Financial Applications and Principle Systems Analysts with COBOL experience. Exposure to DEC-systems 10 and/or 11 desired.

Contact: Pete Rojcewicz.

Technical Writers

Digital is seeking talented, experienced Technical Writers who can research, organize and communicate. You'll be on a par with Engineers and have the potential to advance to Project Management. If you're experienced in generating technical descriptions and servicing information associated with both processors and peripheral devices, we're looking for you.

Contact: Pete Rojcewicz.

Sales Training

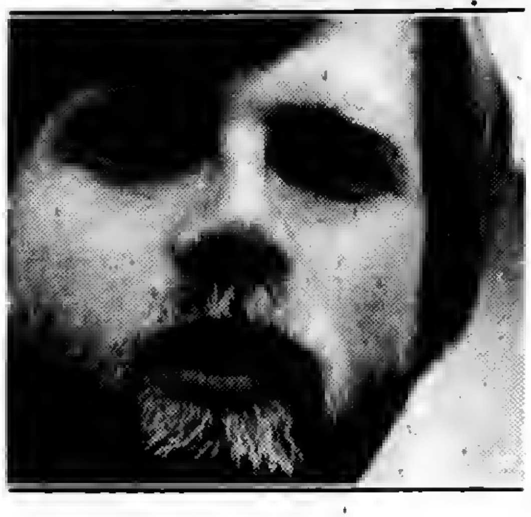
The Sales Training Group is responsible for keeping Digital's sales force informed on new products and new trends in computer sales and the computer business. To provide this service, the group needs qualified Technical Sales Trainers and Program Developers. Our primary needs at this time are for Program Developers who are responsible for putting together course materials for class presentations, as well as Program Developers for self-paced programs on Digital's products and services. Ideally, you will have hardware and software experience and be familiar with course development.

Contact: Bill Mersch.

In-House Field Service

This group is responsible for the installation and maintenance of all computer systems within our Corporate headquarters. We currently need in-house Technicians and Field Service Engineers to work on state-of-the-art hardware in this high visibility environment.

Contact: Jeff Bull.



Educational Services

Responsible for providing technical training to Digital customers and employees, this group is seeking professionals with a solid technical knowledge and a desire to teach or to become involved in course development work. Opportunities are available in both the hardware and software areas, and a field service, maintenance, or applications programming background would be desirable. If you're looking to broaden your career horizons, the wide exposure, technical challenge, and excellent growth potential of one of the largest training organizations in the computer industry is for you!

Contact: Mary Ann Joyce.

Peter

Educational Services

After he had worked his way up to Project Manager with another company, Peter was ready for new challenges. He came to our Educational Services division as an Instructor and is now Commercial Systems Manager with responsibility for teaching all commercial products developed and assessing the need for educational services. Peter's growth to managerial responsibilities was what he was looking for, and he calls Digital "a dynamic company — very people-oriented with good opportunities."

Collins

Field Service: Logistics/Operations Development

Collins brought his considerable expertise in a wide range of applications areas from another major company to here because of "limitless opportunities for advancement." A highly regarded Principle Systems Analyst, Collins is very impressed with Digital's "people-oriented" environment and positive attitude toward our employees. The opportunity he found here to be an individual and "do a little dreaming about future systems" was the answer Collins was looking for.

Sue

Corporate Operations

Sue was attracted to Digital because of our flexibility. "Of course you have policies, but they serve as guidelines. When it comes right down to it, the individual defines his or her own job." Sue, now a Senior Product Support Analyst, works closely with all other areas of the company to help us as we enter new markets. "People here are so responsive and responsible," she says, "very high-quality people."

Bob

Product Support

Digital gave Bob the opportunity to utilize his military training (US Army Defense School, 1969) in creating a successful civilian career. His technical expertise and reputation as a person who could skillfully handle a critical customer situation — both of which he credits to his military training — have resulted in steady promotions. Currently Bob is a Project Manager in our New Products — Mass Storage group and certain that he found the answer to his career questions at Digital.

The Field Headquarters Organization is located in our Corporate headquarters in Maynard, Massachusetts, approximately 25 miles west of Boston. In Maynard and its surrounding communities you and your family will find excellent school systems, contemporary or colonial homes on large parcels of land, equestrian and hiking trails, camping, and all of the things that make life in New England unique. In addition, we're just minutes from some of the nation's premier educational, cultural, and recreational resources.

In Massachusetts, you'll find what are unquestionably some of the finest lifestyles in the country. At Digital's Field Headquarters Organization, you'll find a dynamic and challenging environment to pursue some of the most exciting projects in the industry . . . and the opportunity for the career you've been looking for. If you would like to find out if the answer Peter, Collins, Sue, and Bob found is also the answer for you, please send your resume, indicating salary history and the areas you would like to explore to the appropriate person, Digital Equipment Corporation, Dept. K912, PK3-1/A41, 162 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f

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Salary to $22,000. Requires B.S. in computer related discipline or an equivalent academic/experience combination, 3+ years experience including 2 years of Assembler Language use, experience in design of on-line systems and project leadership. Preference given to candidates with experience utilizing PL/1 or ALGOL, relational data bases, Xerox Sigma or Tandem equipment, and possessing graduate degree and strong communication skill.

PROGRAMMER ANALYST

Salary to $16,000. Requires B.S. in computer related discipline or an equivalent academic/experience combination and 1+ years experience utilizing Assembler Language. Prefer candidates with knowledge of high level language, especially PL/1 or ALGOL, Xerox Sigma, and on-line systems experience.

Excellent benefit package including company paid retirement, relocation, medical coverage, and 4 weeks vacation. Salary commensurate with background and experience. Send complete resume and salary history to Personnel Director:

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Now that we have your attention, we need several programmers and analysts with backgrounds in COBOL, CICS and Data Base and are willing to pay for them! We offer competitive salaries and a full range of company-paid fringe benefits.

We are currently utilizing an IBM 370/148 OS, but may be changing to a larger system due to increased applications in the areas of Manufacturing and Financial Systems. The Manufacturing team is developing MRP, procurement systems, shop floor control and bill of materials systems. The Financial team is presently working on A/R, A/P, payroll, general ledger, and personnel reporting. In both areas, we provide our people with state-of-the-art tools with which to do their jobs including on-line editing, no cards, and test time. If you have experience and are a "get the job done" individual, we would like to talk with you about joining our Systems Group.

Now that we have told you a few things about us, why don't you tell us a few things about you by sending a resume or calling **BILL LEE, Manager Systems at (213) 390-4451, extension 6288.**

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Teleprocessing and Systems Support Programmers

The technical support division of the United States Fidelity & Guaranty Company is currently recruiting for the following openings:

- **Teleprocessing Programmer:** Individual will assist in the implementation of a nationwide telecommunications network of IBM 3790's in a leased line VTAM/NCP environment. Future plans for further sophistication include interactive and distributed data base applications. Those individuals who qualify will be trained to support this leading edge application. We will consider individuals having two years' of OS ALC experience with background in SMP.
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Excellent opportunity for career minded individual who looks forward to eventually expanding abilities into other areas of system support or teleprocessing.

Salary commensurate with experience and abilities. All relocation costs paid by company, liberal benefits package along with comfortable work environment in our modern data processing department.

Please send complete resume, including salary requirements, in confidence to:

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Baltimore, Maryland 21203

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UNIVERSITY OF ILLINOIS
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URBANA CAMPUS

THE FOLLOWING POSITIONS ARE OPEN WITH THE COMPUTING SERVICES OFFICE:

Computing Documentation Writer

This full time position involves the writing/editing and maintenance of a large scale user document for the services offered on a CDC CYBER 175 and an IBM 360/75. A knowledge of computer programming, experience with time-sharing systems, a university degree with a background in communication arts and experience in composing and/or editing computing documentation are required. The position offers avenues for imaginative expression and initiative. Initial salary: $11,000 to $13,000.

Statistical Computer Consultant

This full time position for a statistical computing consultant involves the research, development and maintenance of statistical software on the CDC CYBER 175 and IBM 360/75 computers. The ability to help computer users with statistical computing is of prime importance. This individual should also have the following qualifications:

- General statistical knowledge a must, while experience with statistical software (SPSS, SOUPAC, SAS, BMD, etc.) desirable.
- Programmer/analyst experience with FORTRAN a must, while knowledge of CDC NOS and IBM OS operating systems desirable.

All applicants should have at least one year of experience in the areas described above, and have a university degree with a background in statistics and computer science or closely related fields. Initial salary: $11,000 to $15,000.

Research Programmer—Senior Research Programmer

This full time position is for an individual with demonstrated skills and achievements in at least one of the following areas:

- CYBER 175 NOS systems programming, development, and performance analysis.
- IBM 360 HASP-OS/MVT systems programming performance analysis and maintenance.
- DEC PDP-11 systems programming and hardware development, with an accent on on-line applications.
- Systems measurement and quantitative performance analysis.
- Synchronous and Asynchronous data communications measurement, analysis and development. Knowledge of CDC 2550 desirable.
- Development and implementation of large storage hierarchies.

All applicants should have at least two years experience as a systems programmer, and have at least a bachelor's degree with a strong mathematical basis. Initial salary: $12,000 to $18,000.

SEND RESUMES BY SEPTEMBER 30, 1977 TO:

Director, George F. Badger, Jr.
Computing Services Office
150 Digital Computer Lab.
University of Illinois
Urbana, Illinois 61801

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Link your career to the unprecedented growth of ADR's Software Products Division. Participate in defining, developing, and enhancing our software product line. WE are interested in dedicated software professionals who are capable of doing advanced software development. If you have proven outstanding talents in the job areas shown below, we believe you will want to consider career opportunities at ADR.

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- MVS experience highly desirable.
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- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Strong IBM Assembler language background.
- On-line systems development experience in an OS environment.
- At least 2 years experience or a computer science degree.
- Familiarity with DOS and CICS desirable.

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- Experienced in high-level language interface to Data Base/Data Communications systems.
- IBM Assembler background necessary.
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Please submit resume, in confidence, to: Personnel Dffice, 6th Floor, Holyoke Center, 1350 Mass. Ave., Cambridge, Mess. 02138.

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Minimum five to seven years experience in applications programming in a teleprocessing environment on IBM 370 OS systems. Must be fluent in COBOL and Assembly Language and possess knowledge of IBM's CICS and 3270 terminals. Experience with personnel applications desirable.

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DIRECTOR OF COMPUTER SERVICES/ SENIOR PROGRAMMER: Western Massachusetts Technical School seeking Computer Director. Individual will be responsible for overseeing the management of programming, analysis, and operations in the educational/business departments.
Knowledge of Digital Basic-Plus Program Language and operation of RSTS/E Time Sharing System preferred. Salary to commensurate with experience. Contact: Superintendent/Director's Office, Franklin County Technical School, Industrial Blvd., Turners Falls, Ma., Tel: (413) 774-2066 *An Equal Oooportunity Employer.*

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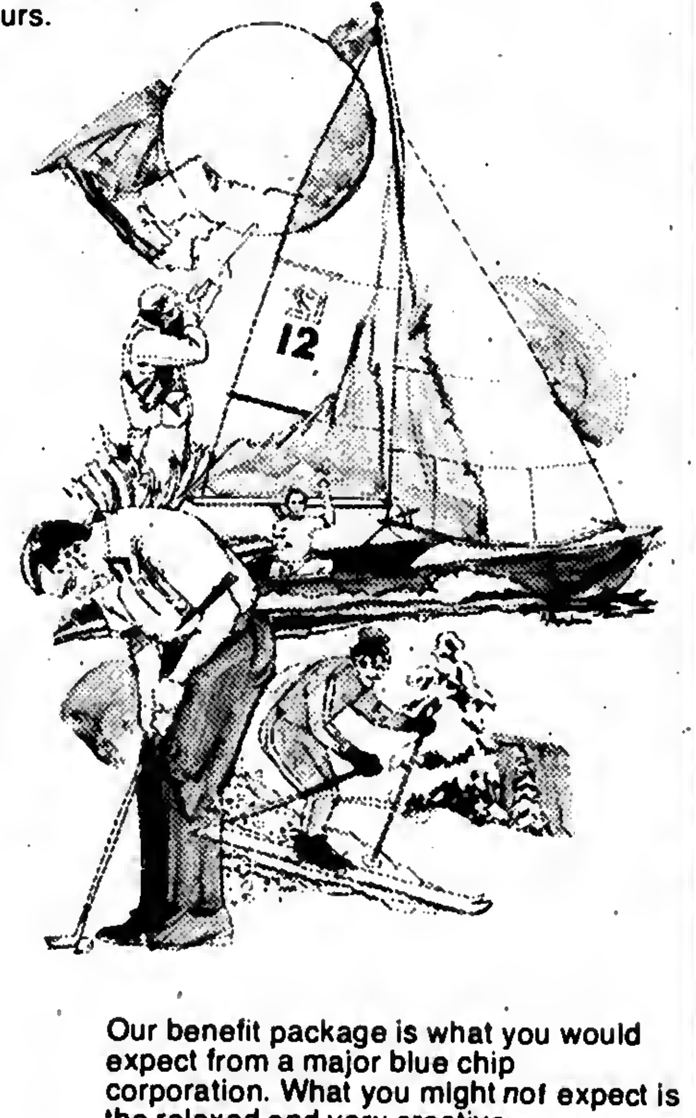

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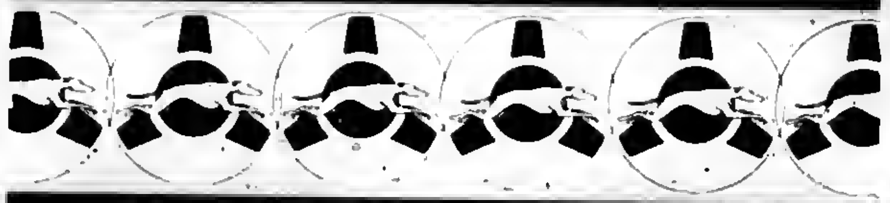

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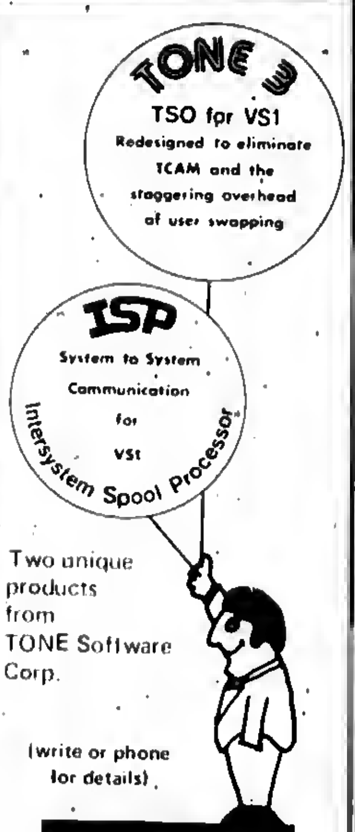
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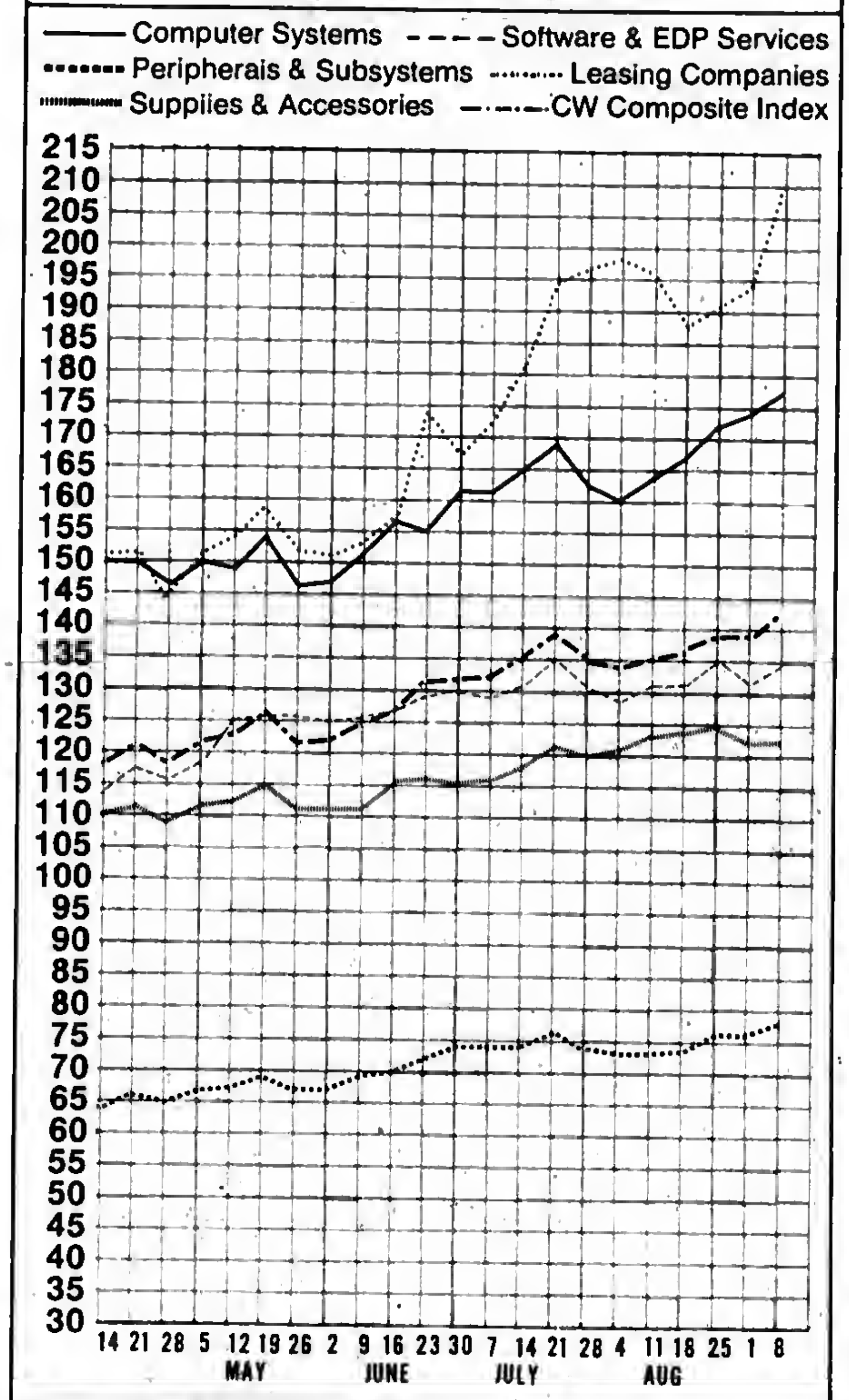

Earnings Reports

DATA SYSTEMS ANALYSTS
Six Months Ended June 30

	1977	1979
Shr Ernd	$.41	$.20
Revenue	2,301,951	1,781,837
Earnings	287,799	173,980

DATATAB
Three Months Ended June 30

	1977	1979
Shr Ernd	$.06	$.14
Revenue	1,579,299	1,533,130
Earnings	41,451	101,342
9 Mo Shr	.15	.24
Revenue	3,112,849	2,899,750
Earnings	105,729	179,427

EDP RESOURCES
Year Ended April 30

	1977	1979
Shr Ernd	$.37	$.99
Revenue	4,954,000	4,792,000
Earnings	353,000	735,000
Revenue	1,319,000	735,000
3 Mo Shr	.18	.11
Revenue	1,319,000	1,269,000
Earnings	152,000	109,000

ELECTRO-CRAFT
Three Months Ended June 30

	1977	1976
Shr Ernd	$.13	$.08
Revenue	4,125,000	2,843,000
Earnings	329,000	208,000
9 Mo Shr	.27	.12
Revenue	7,350,000	4,999,000
Earnings	979,000	310,000

ELECTRONIC ARRAYS
Three Months Ended June 30

	1977	1979
Shr Ernd	.....	$.08
Revenue	$3,409,000	5,049,000
Earnings	(1,109,000)	145,000

ELECTRONIC DATA SYSTEMS
Year Ended June 30

	1977	1979
Shr Ernd	$1.31	$1.10
Revenue	194,199,000	132,952,000
Earnings	18,428,000	13,802,000
3 Mo Shr	.37	.28
Revenue	49,689,000	34,967,000
Earnings	4,859,000	3,532,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 7, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	42	+1 3/4	+4.3
N	BURROUGHS CORP	55- 91	70 1/2	- 3/4	-1.0
O	COMPUTER AUTOMATION	18- 30	28 3/8	- 1/4	-0.8
N	CONTROL DATA CORP	20- 26	21 1/8	- 1/8	-0.5
O	CRAY RESEARCH INC	15- 29	28 3/4	+1	+3.6
N	DATA GENERAL CORP	35- 51	48 5/9	0	0.0
N	DATAPOINT CORP	18- 32	31 1/2	0	0.0
N	DIGITAL EQUIPMENT	37- 53	48 1/8	0	0.0
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	10 5/8	+ 5/8	+6.2
O	FOUR-PHASE SYSTEMS	13- 19	18 3/4	+2	+11.9
N	FOXBORO	42- 54	47 7/8	+ 5/8	+1.3
O	GENERAL AUTOMATION	6- 9	7 1/2	- 5/8	-7.6
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	80	+ 3/4	+0.9
N	HONEYWELL INC	44- 55	48 1/4	+ 1/4	+0.5
N	IBM	245-286	267 7/8	- 1/2	-0.1
O	MANAGEMENT ASSIST	5- 9	7 1/4	+ 5/9	+9.4
O	MEMOREX	23- 34	33 3/4	+1 3/8	+4.2
O	MICRODATA CORP	7- 18	13 5/8	- 3/8	-2.6
O	MODULAR COMPUTER SYS	5- 8	7 1/2	0	0.0
N	NCR	32- 47	45	- 1/9	-0.2
O	PRIME COMPUTER INC	12- 22	22	+1 3/4	+8.6
N	PERKIN-ELMER	17- 22	20 5/8	+ 1/4	+1.2
N	RAYTHEON CO	16- 33	29 3/4	+1	+3.4
N	SPERRY RAND	34- 42	35 7/8	+ 3/8	+1.0
O	SYCOR INC	8- 15	11 1/4	+ 3/8	+3.4
A	SYSTEMS ENG. LABS	5- 8	7 3/8	+ 3/8	+5.3
A	WANG LABS.	10- 14	13 3/4	+1 1/4	+10.0

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/4	+ 1/4	+6.2
O	BOOTHE COURIER CORP	8- 10	11 3/8	+ 1/8	+1.1
O	COMDISCO INC	10- 13	11 1/2	+ 1/2	+4.5
A	COMMERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/4	+28.5
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	6- 9	9	- 1/4	-2.7
N	ITEL	13- 22	20 7/8	- 1/2	-2.3
N	LEASCO CORP	19- 27	24 1/2	+ 1/2	+2.0
O	LEASPAC CORP	1- 2	1 3/4	+ 3/4	+75.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	+ 1/8	+2.2
N	U.S. LEASING	10- 15	14 1/4	+ 1/4	+1.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 1/2	- 3/8	-4.2
A	APPLIED DATA RES.	5- 10	7 3/4	- 1/4	-3.1
N	AUTOMATIC DATA PROC	23- 30	26 3/4	- 1/4	-0.9
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 10	9 1/8	+ 1/4	+2.8
N	COMPUTER SCIENCES	7- 9	9 1/9	+ 3/8	+4.2
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	- 1/8	-9.3
O	COMSHARE	5- 7	6 1/4	+ 1/4	+4.1
O	DATA DIMENSIONS INC	3- 5	3 5/8	+ 1/4	+7.4
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17 3/8	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	+ 1/9	+8.3
O	KEANE ASSOCIATES	3- 4	4	+ 1/4	+6.6
O	KEYDATA CORP	2- 3	2 1/2	+ 5/8	+33.3
A	LOGICON	7- 17	12 1/4	+ 1/9	+1.0
A	MANAGEMENT DATA	1- 2	2	+ 1/8	+6.6
A	NATIONAL CSS INC	19- 26	24 3/8	- 5/8	-2.5
O	NATIONAL DATA CORP	4- 7	6 5/8	+1 1/4	+23.2
A	ON LINE SYSTEMS INC	17- 22	17	- 3/8	-2.1
N	PLANNING RESEARCH	3- 6	5 3/8	- 1/8	-2.2
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 5/8	0	0.0
O	REYNOLDS & REYNOLD	17- 20	18 3/4	+ 1/2	+2.7
O	SCIENTIFIC COMPUTERS	1- 4	4 1/4	+ 1/4	+6.2
O	TYMSHARE INC	14- 23	21 1/4	- 3/9	-1.7
A	URS SYSTEMS	4- 5	4 3/8	+ 1/4	+6.0
N	WYLY CORP	1- 2	7/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	14 3/8	+ 1/2	+3.6
O	ADVANCED MEMORY SYS	7- 9	7 3/8	- 1/8	-1.6
N	AMPEX CORP	8- 11	10 5/8	+ 1/8	+1.1
O	ANDERSON JACOBSON	3- 5	3 3/4	- 1/8	-3.2
N	APPLIED DIG DATA SYS	10- 20	17 3/4	- 3/4	-4.0
O	BEEHIVE INT'L	8- 12	9 7/8	+ 1/4	+2.5
A	BOLT,BERANEK & NEW	7- 8	7 1/4	0	0.0
N	BUNKER-RAMO	8- 12	11 1/4	+ 1/4	+2.2
A	CALCOMP	3- 5	3	+ 1/8	+4.3
O	CAMBRIDGE MEMORIES	1- 4	3 1/2	+ 5/9	+23.9
N	CENTRONICS DATA COMP	22- 30	29 7/8	- 1/8	-0.4
O	COGNITRONICS	1- 1	5/8	+	+10.0
O	COMPUTER COMMUN.	5- 7	8	+1 1/8	+16.3
O	COMPUTER CONSOLES	4- 7	4 1/4	+ 1/4	+6.2
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	+ 1/4	+22.2
O	COMTEN	9- 13	10 3/8	+ 1/4	+2.4
N	CONRAC CORP	19- 29	22 1/4	+1 1/8	+5.3
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 5/8	+ 3/8	+5.1
A	DATA PRODUCTS CORP	9- 16	14 3/8	- 1/2	-3.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/9	0	0.0
O	DECISION DATA COMPUT	2- 3	2 3/8	+ 1/8	+5.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 3/8	- 3/8	-4.8
O	DATARAM CORP	2- 8	8	+ 1/4	+3.2
N	ELECTRONIC M & M	4- 5	4 1/8	+ 1/9	+3.1
O	FABRI-TEK	1- 2	1 1/8	+ 1/8	+12.5
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/8	-10.0
N	HAZELTINE CORP	9- 12	8 1/2	- 3/8	-4.2
N	HARRIS CORP	28- 39	37 5/8	+1	+2.7
A	INCOTERM CORP	10- 15	12 1/8	+ 1/8	+1.0
O	INFOREX INC	4- 7	5	+ 5/8	+14.2
O	INFORMATION INTL INC	9- 14	11 1/4	-1	-8.1
O	INTEL CORP	38- 57	46 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	4 1/4	+ 1/8	+3.0
O	MSI DATA CORP	6- 12	11 1/2	+1 1/8	+10.8
N	MOHAWK DATA SCI	5- 8	6 1/2	0	0.0
O	PENRIL CORP	2- 5	3 7/8	+ 1/8	+3.3
A	PERTEC CORP	7- 9	9 3/9	+1 1/8	+13.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 3/4	- 1/8	-3.2
O	RECOGNITION EQUIP	6- 10	8 7/8	+ 1/2	+5.9
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 16	15 3/8	+ 1/8	+0.8
O	T BAR INC	7- 12	11 7/8	+ 1/4	+2.1
O	TALLY CORP.	4- 6	4 1/2	- 3/8	-7.6
A	TEC INC	7- 10	8	+ 1/8	+1.5
N	TEKTRONIX INC	29- 38	37	0	0.0
N	TELEX	2- 3	2 3/4	0	0.0
O	WILTEK INC	1- 1	5/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 1/4	+ 1/8	+2.0
O	BALTIMORE BUS FORMS	2- 4	2	0	0.0
A	BARRY WRIGHT	10- 14	13 5/8	0	0.0
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 3/8	+ 3/8	+2.2
N	ENNIS BUS. FORMS	6- 7	6 1/8	+ 1/4	+4.2
O	GRAHAM MAGNETICS	11- 17	16 5/8	+ 1/8	+0.7
O	GRAPHIC CONTROLS	15- 18	15 1/2	0	0.0
N	3M COMPANY	48- 56	52 5/8	+ 1/2	+0.9
O	MOORE CORP LTD	26- 37	28	+ 3/4	+2.7
N	NASHUA CORP	16- 27	25 3/8	+ 1/4	+0.9
O	STANDARD REGISTER	18- 25	21	0	0.0
O	TAB PRODUCTS CO	13- 19	16	- 1/2	-3.0
N	UARCO	19- 22	18 7/8	- 3/8	-1.9
A	WABASH MAGNETICS	10- 15	12 1/2	+ 1/2	+4.1
N	WALLACE BUS FORMS	17- 21	18 1/4	- 1/8	-0.6

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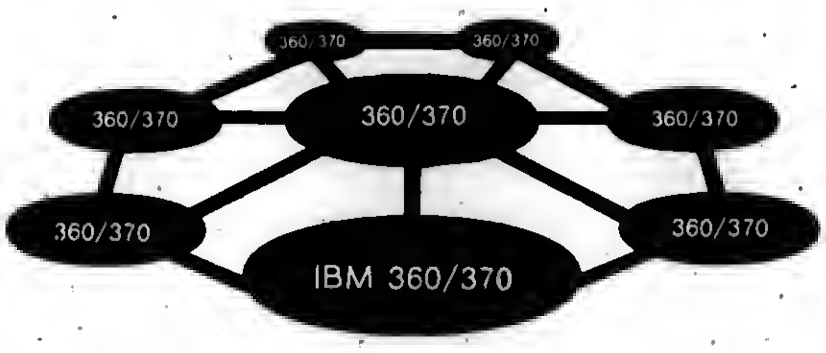

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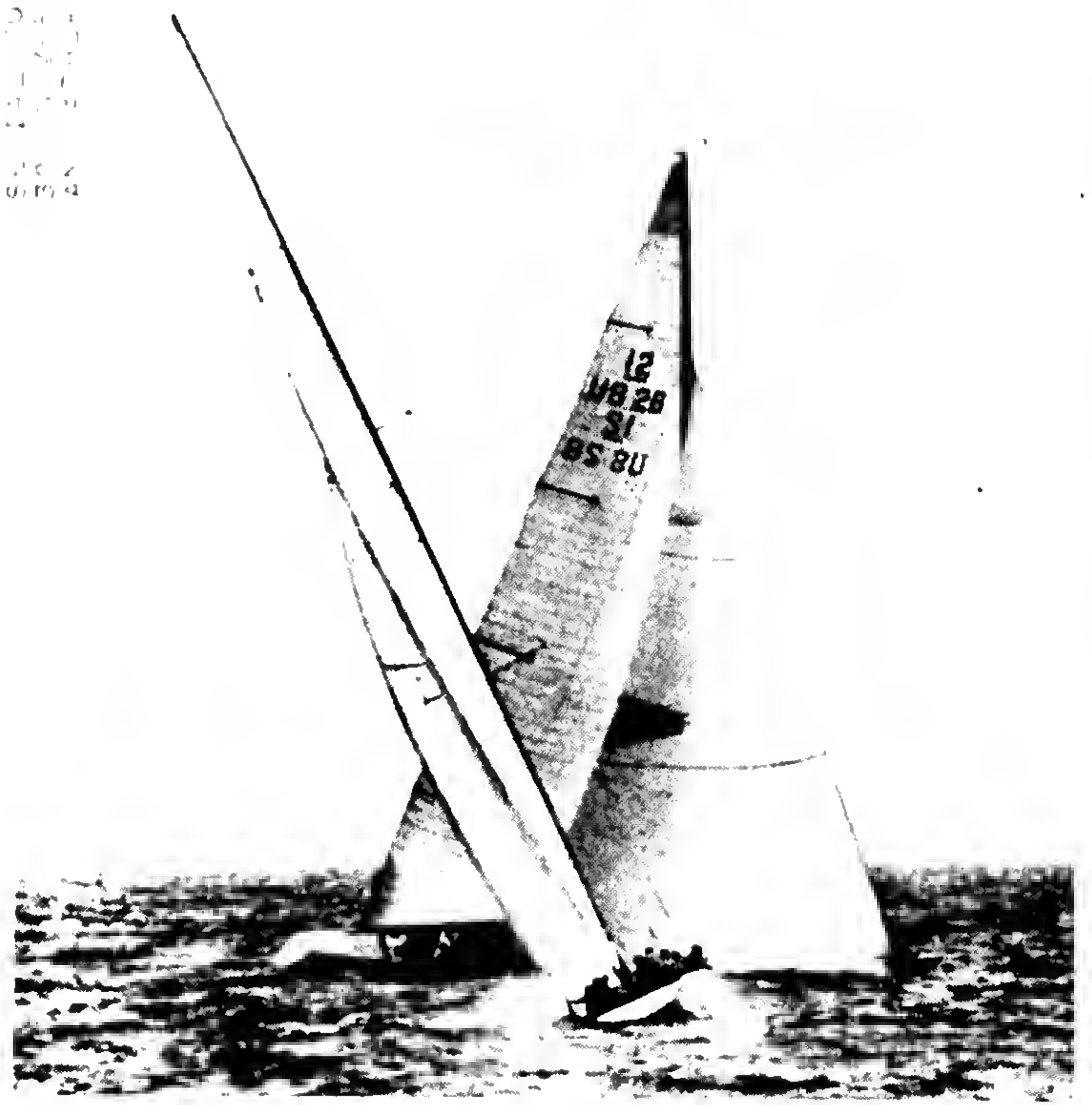
A computer is helping guide America's Cup defender Courageous, shown here (background, U.S. 26) opening a lead on challenger Australia last week.

Micro Challenges Tradition At America's Cup Races

By E. Drake Lundell Jr.
CW Staff

NEWPORT, R.I. — A century of sailing tradition is being challenged here during the 23rd America's Cup Challenge Races as an outsider gained the role of helmsman for the American defender Courageous and computers moved on board many of the contending yachts.

Ted Turner, who is sailing Courageous, clearly does not fit the image of the aristocratic gentleman yachtsman and in fact has been called the "mouth of the South" along the docks here.

Likewise, the computer system aboard Courageous that handles most of its navigation functions hardly fits the traditional image of a navigator clutching a compass in one hand and a pile of charts in the other.

But while the brash advertising executive from Atlanta may not set the style for future America's Cup helmsmen, the computers are clearly here to stay.

Of the two boats in the finals for the cup here this week, the Courageous is clearly the most computerized. 50% of the half-dozen original contenders, however, placed a great deal of reliance on computer systems.

The computer system aboard Courageous is based on an LSI-11 microprocessor from Digital Equipment Corp. and uses specially designed digital input units from Signet Instrument Co. and a hand-held terminal from Termiflex Corp., according to Bill Jorch, Courageous navigator.

Its competitor in the final best-of-seven series — the Australian yacht Australia — relies, on the other hand, on analog instrumentation and hand-held programmable calculators for its navigational duties, sources here said. The Australian challengers said they would rather not talk about equipment aboard the boat until the races end.

(Continued on Page 6)

Alternatives Catch Eye, Not Buy, of IBM Users

Almost all large IBM computer users have considered switching to alternative mainframes and two-thirds have gone as far as evaluating the independent CPUs, according to a *Computerworld* survey of 370/158 and 370/168 users.

However, while the users are apparently willing to at least look at the alternatives, less than one-fourth are actually switching from IBM systems.

In the survey, 97% of the users said they had considered the alternatives from Amdahl Corp. or Itel Corp.; the rest — only 3% — indicated they were such confirmed IBM shops they would not even consider switching.

Of the sample, 65% had carried their considerations as far as an evaluation of the alternative equipment; 23% said they were gong to switch and 61% said the evaluation had convinced them to stay with IBM. The remaining 16% have not yet made a decision on the alternative equipment.

Cost advantages and better delivery schedules were cited as reasons for switching to an Amdahl CPU, although those fortunate enough to be listed for early Model 3033 processors from IBM said delivery was not a criterion for them.

Several users who decided against an alternative system said they had reservations about support from the non-IBM vendors and also doubted these systems could offer full software interchangeability.

Ford Motor Co. in Detroit — one of the users that decided to switch — has scheduled installation of an Amdahl 470V/6-II mainframe for November. The company made an evaluation of alternative systems when the lease on its 370/165 was nearing its end, a spokesman said.

The Amdahl machine was evaluated against an IBM 3033 CPU and found to have two advantages: it offered cost savings and it could be delivered sooner than the 3033.

The Ford DP center that will install the Amdahl CPU will swap the 165 for the 470 while keeping presently installed peripherals. These include Storage Technology Corp. tapes and disks and Memorex Corp. disk drives.

This is the first article in a three-part survey of users' attitudes toward alternative CPUs, distributed processing and IBM's Systems Network Architecture (SNA) by Jeffry Beeler, Ronald A. Frank and Molly Upton.

One of the benefits of switching to the Amdahl machine is that the DP center can continue to operate with IBM's MVT operating system. The 3033 would have required an immediate upgrade to MVS, but the Amdahl 470 will operate with MVT and give Ford the option of upgrading to MVS at any time, the spokesman said.

Hallmark Cards, Inc. in Kansas City, Mo., also has been looking at Amdahl CPUs as alternatives to its dual 168s, according to Ron Schmidt, senior technical services analyst.

The company evaluated an Amdahl 470V/6 against the IBM 168 and found the 470 had about 1.4 to 1.8 times the processing power at about 10% to 12% less money on a price-performance comparison, Schmidt said.

Performance and support of the Amdahl CPU appears to be equal to that provided by IBM, he added, but delivery advantages seem to be getting reduced because Amdahl deliveries are "getting further out."

Comparisons with Itel processors were described as "less impressive." Control Data Corp.'s Omega systems were designed more for the smaller 370 systems, he added.

R.L. Babcock, information processing manager for the Joseph Schlitz Brewing Co., admitted that his company has toyed with the idea of replacing his company's 168 with an Amdahl machine (he doesn't remember the model number), but said the Milwaukee-based firm has never seriously considered the option.

Because the brewer was on the verge of installing a new IBM 168 when it met with Amdahl representatives, Schlitz officials saw no point in taking the time and trouble to evaluate equipment. Instead, they merely discussed the financial pros and cons of replacing the IBM mainframe with Amdahl hardware, Babcock said.

Schlitz purchased its 168 very re-

(Continued on Page 4)

Technology or Applications More Crucial to Growth?

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Which is the greater driving force behind the growth of the computer industry — technological advances or applications development?

The answer is technology, according to Isaac Auerbach, president of Auerbach Publishers, Inc. of Pennsauken, N.J. Speaking at the Fifteenth Computer Society International Conference, Compcon 77, sponsored by the Institute of Electrical and Electronic Engineers here recently, Auerbach made special note of the promises and problems associated with memory technologies.

For Joe M. Henson, vice-president of market planning for IBM's Data Processing Division, however, "productivity in applications development is really the critical challenge that faces the industry and users alike" if meaningful growth is to continue.

Both Auerbach and Henson agreed that users haven't taken advantage of the available technology which has come about "faster than anyone expected."

But the technology which facilitates applications also makes their development more difficult, Henson added

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In Antitrust Testimony

Witnesses Agree: IBM a Monopoly

By Catherine Arnst
CW Staff

NEW YORK — After two years of presenting evidence, the government is providing some conclusions to the court in the U.S. vs. IBM antitrust case. The noteworthy point is that the conclusions of an industry observer who did not want to testify for the government closely paralleled those of the government's chief economic adviser for this lawsuit.

It is not surprising that Dr. Alan K. McAdams, a Cornell professor who has been working on this case since 1971, testified IBM erected significant barriers to entry to maintain its alleged monopoly position in the computer industry [CW, July 11, 18]. He helped prepare the pretrial brief and was naturally expected to make an anti-IBM analysis when he took the stand.

Observers were not so certain of the testimony of Frederic G. Withington, an Arthur D. Little, Inc. consultant who fought the government subpoena until the week before he appeared in court. One might have assumed that Withington, who testified after McAdams, would have been predisposed against the government's case. Instead, he may have been the Justice Department's best witness by substantiating McAdam's testimony [CW, Aug. 8, 22, 29].

Both men testified extensively on the subjects of market definitions and barriers to entry. With the first subject they were in almost complete agreement except for some semantic distinctions.

The computer mainframe market can be broken down into four subsections — scientific, general-purpose, small business and special-purpose computer systems, according to both men. The general-purpose computer system market is the largest subsection and IBM has 68% of that market, Withington said.

By dominating that market, IBM can control the other subsections as well as the plug-compatible peripherals market, testimony indicated. Users can utilize large general-purpose computer systems to do scientific applications, but scientific computers do not have the appropriate software to do business applications, thus limiting that market.

Because it dominates the largest subsection of the industry, IBM can also erect barriers that block entry into the entire industry, both Withington and McAdams testified. Both dwelled on "software lock-in" as one of the more substantial barriers to entry.

Analysis

IBM initiated software lock-in with its first systems in the early '60s, thus tying users to IBM systems because a switch to another manufacturer's computer requires scrapping the existing programming. IBM had a large installed base at that time because of its substantial punch card business; once these users switched to IBM computers, they tended to stay there.

This barrier to entry was cemented into place when IBM announced its 360 line, which promised a series of fully compatible systems, making it easy for users to upgrade from one IBM system to another.

Accordingly, for another manufacturer to effectively compete with IBM, it too must provide a full line of compatible systems, Withington asserted.

The competitor must also provide a large maintenance and support force with at least 100 regional offices, enough internal capital to support leasing and a line of plug-compatible peripherals broad enough to cover any type of application the user may want, Withington said. These are necessary because the industry giant has them and so established them as prerequisites for market entry.

Withington estimated the cost of entering the general-purpose market in 1977 would be $400 million.

McAdams, the economist, gave the theory behind Withington's observations. The test of a truly competitive market is the ease of both exit and entry, he testified.

If Withington's estimates were correct (and they were nearly identical to IBM estimates for market entry), then the market is monopolized, according to McAdams' criteria.

Only the largest and most well-established firms can even hope to successfully enter the computer market, he said. Even then, there is a good chance they won't succeed, as evidenced by the failures of General Electric, RCA, Singer and Xerox. These companies also proved the difficulty of exiting the market, as all suffered substantial losses by leaving.

A crucial element of McAdam's testimony was his observation that a monopolist has power over price and will raise or lower that price to contain competition, rather than to benefit the consumer. IBM always maintained a high profit margin for its products and, when it felt threatened by a competitor such as Memorex, would drop that price to the "Death Level," McAdams said.

"Death-level pricing" was the term used in an internal IBM document to describe the level to which a price can be lowered to cause a competitor to lose money if he tries to match it. The strategy was used time and again in the peripherals market, according to government charges.

Withington's description of IBM's pricing policies indicated he agreed with McAdam's view of the corporation's power over price. He insisted, even under intensive cross-examination, that IBM's motivation for lowering prices was to destroy competition.

The witness gave the same reason for most of the technological changes that IBM has developed, even though some of them have benefited the user.

As an example, he cited IBM's May announcement of its Model 3033 central processor, which he felt was obviously meant to stop competition from Amdahl Corp.'s 470V/6.

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Strong Executive Role Urged in New OTP

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's plan to move the Office of Telecommunications Policy (OTP) out of the White House and into the Department of Commerce under a new assistant secretary provides a "unique" opportunity for the executive branch to develop a strong leadership role in communication and information policy, the Aspen Institute and industry members told Congress here recently.

Appearing before Rep. Jack Brooks' (D-Texas) House Subcommittee on National Security and Legislation, Glen O. Robinson, a special adviser to the institute, added, "We would be disheartened if this opportunity evaporated from neglect or timidity in providing a purposeful mandate to the new office of the Assistant Secretary for Communication and Information."

Robinson and Paul G. Zurkowski, president of the Information Industry Association (IIA), agreed with congressional and industry criticisms leveled at teh President's reorganization team in recent weeks for its failure to specify what responsibilities the new Assistant Commerce Secretary and his office will have [CW, Aug. 15].

"Our guiding premise is that the assistant secretary should have a clearly defined policymaking role, with a clear specification of his or her policy domain," Robinson said.

First, the new office, created by the merger of OTP and the Office of Telecommunications (OT), won't be able to attract the high-level talent it needs to infuse the communication and information area with "a competence and professionalism" so badly needed, Robinson said.

Second, without a clear mission statement, the office can't be organized well internally, he added.

Finally, and "possibly the most important failure of all," the office will suffer "the awkward and embarrassing inability to relate to the other executive agencies that deal with communication and information policy," he stated. Robinson predicted that in the absence of a well-defined role, the assistant secretary could never be the President's principal spokesperson in these fields.

Urged Rewrite Support

The Aspen Institute representative urged Brooks and his House Government Operations Subcommittee to support the rewrite of the executive and departmental orders — the two documents which define the authority the assistant secretary and his office will have.

During the hearing, Congressman Brooks strongly expressed his desire to leave these orders alone.

Brooks suggested the executive branch "might write in all kinds of duties I won't agree with" if it is allowed to revise the orders. "I'm very cautious about executive orders," he added.

Arguing that there is no legal requirement to retain the present Executive Order 11556 which defines OTP's duties, Robinson said the departmental order is really the key to the new office's success.

Calling the new office the "National Communications Agency," for want of another name, he suggested its communication and information arms would be on a par with each other. The new agency would be responsible for formulating domestic communication and information policy relating in the private and public sectors.

The Commerce Department agency would also be in charge of setting international communications and information policy, under the Aspen scheme. This would include policies involving the industry structure and performance of the U.S. international communication carriers.

Policy formulation in the area of exports and imports of information and communication technologies and services and their domestic and foreign social and economic impacts would be still another field within the agency's realm of responsibility, Robinson said.

The Aspen Institute would have the national communications agency conduct a research program on the characteristics and uses of communication and information technologies and resources. The agency would also support the federal agencies in their procurement, system planning and implementation of these technologies, Robinson stated.

The new agency would be in a position to recommend to the Office of Management and Budget (OMB) policies for the procurement of communication and information technologies and services, he added. It would also be charged with the coordination of plans and programs to mobilize the nation's public and private communications and information resources in the event of a national emergency.

Like Robinson, Zurkowski of the IIA supported the opportunity for change provided by the reorganization of OTP and the creation of the new Assistant Commerce Secretary.

The new assistant secretary should have a deputy for information policy, Zurkowski stated. In addition, some of the computer policy roles of the Office of Science and Technology in the Commerce Department should be delegated to the new office as well, reflecting the overlap between these technologies, he added.

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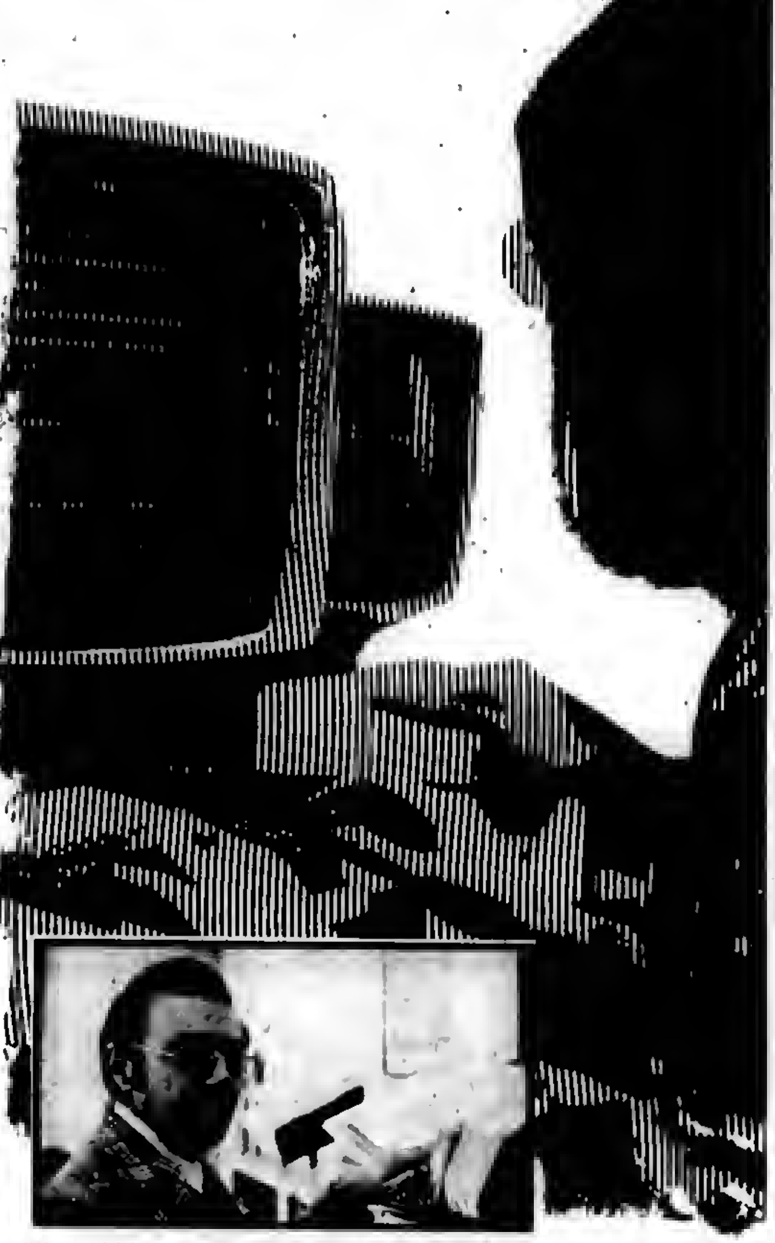

"It would be very difficult to take ROSCOE away now . . . ," Life of Georgia Technical Analyst, Earl Ryan, speaking about ADR's on-line conversational programming system.

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Large IBM Users Browsing But Not Buying Alternatives

(Continued from Page 1)

cently, company officals are not inclined at this point to seriously consider installing an IBM replacement.

William Shine, senior vice-president of the Chase Manhattan Trust Department in New York, said his bank has considered both Amdahl and Itel machines as replacements for its 168. But, he added, the bank has decided against those alternatives.

The alternatives might have more appeal for the bank if they were intended for internal applications only. Unfortunately, the current computer system is for customer service applications, so the reliability of that system — or any replacement — is paramount, he explained.

Shine also expressed concern about the replacements' software. Theoretically, he said, the Amdahl and Itel software is interchangeable with IBM's, but in practice there are inconsistencies.

Sticking With IBM

Bill Fore, manager of the technical staff group for Sun Information Services in Dallas, said his firm looked at Amdahl's 470V/6 about a year ago, but decided on a 370/168 instead.

Sun stayed with IBM, he said, because there was a question of service with the Amdahl unit. Further, Sun got a good financial deal, so the difference in cost between a 168 on a long-term lease and the 470 "didn't seem to warrant the exposure and risk," Fore said.

In addition, Sun was running flat out; the company was in a transition period and didn't have software people to spare should the Amdahl need some special attention, he said.

Ralston Purina Co. in St. Louis didn't really consider Amdahl or other IBM alternatives because it got very good delivery dates on the two 3033s it ordered, according to Chuck Childers, general manager of computer services.

The IBM machines are due in September and December of 1978, he said, and the firm is investigating a package deal which would involve subleasing the 168 and 158 it has from Itel and arranging a long-term lease on the 3033s.

Ralston Purina has had IBM CPUs since 1966, although it has gone to other vendors for nearly everything else, including about 300 Univac Uniscope terminals which it links with IBM's IMS through its own teleprocessing program.

The firm has converted to MVS, according to Childers, who praised such capabilities of the system as resource management, more than 15 initiations and more concurrent jobs, as well as the ability to use new IBM peripherals.

But using MVS is also "a matter of keeping pace," Childers said. IBM plans to drop support on MVT.

With MVS, the firm has discovered some application program dropout. Although MVT tolerated various deviations from specifications in the programs, MVS didn't, he said.

Wavering on 470

Jeff Dunn, assistant DP director of Northwestern Mutual Life Insurance in Milwaukee, said his firm has considered replacing its 168 with an Amdahl 470V/6-II. In fact, the company already has placed an order for the Amdahl machine, but Dunn and his colleagues have not yet decided whether to confirm the order.

Dunn cited improved delivery as one reason Northwestern is considering replacing its IBM mainframe. If they confirmed the Amdahl order, company officials could expect delivery by the third quarter of next year.

Goodyear Tire and Rubber Co. in Akron, Ohio looked "lightly" at Amdahl's 470V/6, but made no decision to go with it. At the time Goodyear was looking, Amdahl had only about 30 installations, many of which were in university and government environments, according to John Longstreth, manager of DP support services.

The firm has no plans to reconsider Amdahl at this time, he said.

Monsanto Co. in St. Louis has looked at Amdahl's V6 and V7, but not really seriously because management has not indicated a desire to go outside of IBM for equipment, according to Frank X. Fallert, manager of performance analysis.

Monsanto has gotten as far as recognizing the existence of Amdahl, he added.

Firestone Tire & Rubber Co. has flirted briefly with the idea of installing an IBM replacement, according to the company's operations manager, H.W. Guthrie. But the Akron, Ohio firm never seriously followed through with the hardware installation.

Guthrie said Firestone's central computer system incorporates hardware from IBM competitors like Itel, so to dismiss Firestone's DP department as an all-IBM shop would be misleading. When it comes to CPUs, however, the company likes to avoid mixing equipment, the manager explained.

Firestone evaluated Amdahl equipment as a replacement for its IBM 158, but Guthrie said he didn't remember the model number of the potential alternative.

Leo Harris, operations manager for Blue Cross/Blue Shield in Richmond, Va., said that firm "briefly" considered replacing its IBM 158 with an Amdahl 470V/5 or 470V/6, but eventually decided against the switch.

Harris described his firm as "very conservative" and admitted company officials had expressed some concern about Amdahl's long-term viability. "Amdahl is still essentially a one-product company," Harris said.

If Amdahl gains a larger market saturation and wider product line, Blue Cross/Blue Shield would feel more confident about its long-term survival prospects, he added.

PPG Industries, Inc. has not seriously considered replacing its three IBM 158s with Amdahl, Itel or CDC hardware, according to D.L. Campbell, director of the company's computer center.

PPG is very conversative in its organization and corporate policy, Campbell explained, and has already committed itself strongly to IBM equipment. This commitment sometimes causes problems for the company, but it has the advantage of being safe, he said.

Ashland Oil in Ashland, Ky., is considering an Amdahl 470V/6, but Stan Wonn, administrative assistant for computer science and services, said the firm is a heavy IBM user.

Ronald Leone, data center manager for Sears Roebuck Co. in Philadelphia, said Sears has "tinkered with the idea" of replacing the firm's 158 with one of the IBM alternatives, but "has done nothing serious" about the matter. He doesn't know which of the alternatives the company has evaluated because most of the decision concerning computer equipment selection are made at Sear's Chicago headquarters.

Amoco Production Co. has considered replacing its IBM 168 with an Amdahl 470V/6 CPU, but the firm has not yet decided whether it will make the equipment switch, operations manager William Caldwell said.

Because Amoco is still in the early stages of evaluating the IBM replacement, it is unable to say at the moment what the potential advantages and disadvantages of the Amdahl hardware are.

No Switch Considered

J.C. Penney Co. has not considered switching to the IBM replacements because the Wauwatosa, Wis.-based firm wants to avoid the problems that arise from having too many different kinds of equipment at the same site. Penney already uses IBM peripherals at the Wauwatosa data center.

Nor has Oscar Mayer Co. considered switching from its 158 to the IBM replacements, according to Roger Tietz, the company's compoter manager. The Madison, Wis.-based firm considers itself an IBM shop and plans to maintain that status for some time to come, Tietz explained.

But Prudential Insurance Co. of America in Roseland, N.J., not only evaluated the Amdahl 470V/6, but installed one in addition to its 370/168 about eight months ago, according to Mike Capo, shift supervisor.

The 470V/6 was selected for teleprocessing duties because it was faster than a 168, John Richards, system programmer, indicated.

"Overall we've been very impressed with it," Richards said. Capo noted the system had been subject to some downtime, but said it does the work of a 168.

R.N. Wehling, technical services manager of Alcoa Aluminum in Pittsburgh, Pa., said his company has not considered replacing its 158 with any of the IBM alternatives. He said the firm already owns its mainframe and plans to use it for a while.

Bud Patterson, production manager of Union Carbide's Chemical Division in South Charleston, W. Va., refused to disclose whether his company has considered replacing its 168 with IBM alternatives. He said that information is confidential.

Comment Deadline Extension Delays Computer Inquiry Again

WASHINGTON, D.C. — The Federal Communication Commission's (FCC) second Computer Inquiry has been stalled a second time.

The latest delay to the year-old inquiry into the definition of data processing and potential DP service offerings by common carriers occurred when IBM requested the date for filing reply comments be extended from Sept. 12 to Oct. 14.

The initial holdup of the comment portion of the Inquiry came when AT&T asked for a 90-day delay of the due date for participation — from July 25 to Sept. 12.

In both cases, the corporation involved is preparing a study to accompany its comments as an appendix. IBM's "expert study" will be on "the effects of public utility regulation in a competitive environment," the corporation told the FCC.

Because they had already granted an extension of time for AT&T, the FCC comissioners felt they could do no less for IBM and thus moved up the deadline for filing reply comments to Monday, Oct. 17.

Some 80 participants in the Inquiry submitted comments on the FCC's proposed definition of Data processing last June 6 [CW, June 13]. The reply comments represent the second round of participation by users, trade associations and industry members.

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Bell's Remark Stirs Debate

Congress Eyed as Right AT&T Antitrust Forum

By Ronald A. Frank
And Edith Holmes
CW Staff

WASHINGTON, D.C. — A recent suggestion that the AT&T antitrust trial should be decided by Congress instead of the courts has drawn opposition statements from several communications organizations.

The suggestion was made by U.S. Attorney General Griffin Bell in an interview with *Fortune* magazine in which Bell said the AT&T suit should be handled by Congress.

Several organizations, including the Independent Data Communications Manufacturers Association, the North American Telephone Association and Phonetele, Inc., have taken issue with Bell, while AT&T has registered its general approval.

The attorney general has proposed on several occasions — most recently in the *Fortune* interview, scheduled for publication in November, that big antitrust cases involving a restructuring of an economic system "would perhaps be better . . . done by Congress than by a single federal judge."

The final judgment, the attorney general acknowledged, would be political. But why not, when most economic decisions on behalf of the U.S. are politically based? he asked.

Interest Waning?

A Justice Department spokesman, contacted for clarification of Bell's remarks, denied Bell's remarks signal the department's interest in the case is waning.

"We are committed to trying the AT&T case in court. Bell and John Shenefield [acting assistant attorney general] are doing everything possible to expedite the case," he said.

"Bell has no intention whatsoever of taking AT&T to Congress," the spokesman added.

Bell simply used the AT&T case as an example of the kind of antitrust suit so closely involved with economic and social issues that might be settled by Congress in the future, the spokesman explained.

A spokesman for the IDCMA said, "The attorney general has apparently admitted that the antitrust laws are unworkable — at least when a very large organization like AT&T is involved."

If the attorney general simply intends to abandon the AT&T suit, his action may be interpreted as a concession to monopoly and an admission that the U.S. is powerless to do anything about it under existing laws, the spokesman said.

The North American Telephone Association (Nata), an organization of companies that compete with the telephone company, issued a statement which said that Bell "apparently based his statements on the belief that the suit with appeals will take 10 to 15 years to settle.

"Bell's statements indicate a very dangerous situation. The Justice Department has a clear mandate under the antitrust statutes of this country to prosecute any company involved in restraints of trade. Furthermore, Congress should not be asked to reaffirm its clearly established procompetitive principles on a case by case basis," Nata said.

In a speech delivered at the annual Nata convention in Washington, D.C., Sen. Gary Hart (D-Col.) said Bell's remarks could signal the state of a debate on the proper role of Congress, the executive branch and the judicial branch in promoting free market principles.

"The attorney general suggested that Congress may be the better forum for reaching what he termed "political judgments." This strikes me as an oversimplified explanation of what is wrong with our current methods of antitrust enforcement," Hart said.

"I am not sure Congress is a better forum than the courts for resolving the AT&T case. That case involves not only political judgments, but also alleged predatory and anticompetitive practices, which have precise judicial and legislative definitions," he said.

A more favorable comment on Bell's opinions was made by AT&T board chairman John deButts. Appearing on a recent ABC "Issues and Answers" program, deButts told an interviewer: "When you get into organizational structure of an industry, it is beyond the antitrust laws and their purpose. If you're breaking the law, you should be penalized and should have to pay a fine or maybe even go to jail.

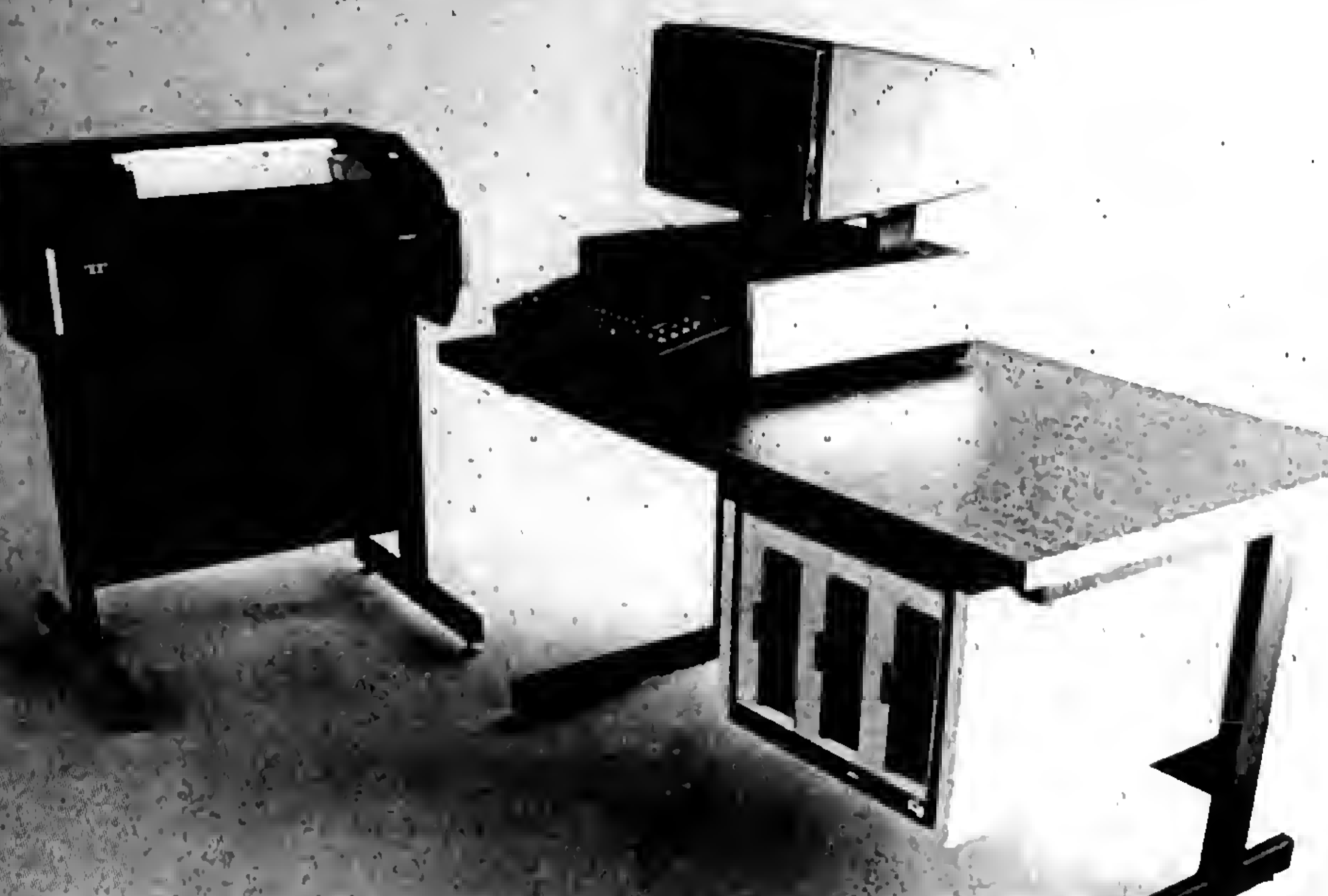
"But from the standpoint of the total society, the reorganization of the structure of an industry goes beyond that and maybe the decision should be made by the Congress of the United States. And with that philosophy I agree."

As a result of Bell's comments, a letter was sent to the attorney general by Robert Feiner, president of Phonetele, Inc.

In it, Feiner told Bell that "If you intend to refer any issues contained in your suit against [AT&T] to the Congress, then I believe it is now incumbent upon the Justice Department to investigate precisely how obligated each member of Congress may be to AT&T, et al."

Bell's statement "served no useful purpose to anyone but AT&T by fortifying its efforts in Congress."

WHO PUTS AT&T IN THE DATA PROCESSING BUSINESS?



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Technology or Applications More Crucial?

(Continued from Page 1)

"Computer technology has extended our applications horizons but those horizons are harder to achieve," he said. Techniques developed to reduce the problem of implementing applications such as interactive programming systems and program generators aren't being used to the extent they should be, according to Henson.

The IBM executive predicted that future developments in the area of applications will be "evolutionary." The industry won't see any "breakthroughs" in this field, he stated.

'More Profound' Results

While Henson applauded technological advances, he suggested that improvements in equipment price/performance ratios should result in more than the same job accomplished faster. Advancements in technology should permit "more profound things," he maintained.

Many applications include non-DP people whose part in the system is essential to its operatioin and so must be clearly understood, Henson said. There is a "user thrust toward operational systems" as a result, he noted.

Henson identified another class of applications — those involving technical and management forecasting modeling, end-use design and other planning functions. Both the operational and the planning applications demand more data, which often means a need for large data base systems. These systems add to the difficulty of developing the applications themselves, he said.

The problems presented by data bases, go hand in hand with those attendant with price/performance improvement in graphics and communications, Henson suggested. These technologies may have all kinds of potential uses, but their development into applications might cost more than the user can afford.

There are other problems which accompany technological advances as well. Among them are system security, auditing and privacy, he said.

The tools needed to simplify the development of applications are available but aren't used, Henson stressed. Virtual memory, preprogrammed telecommunication controllers, chief programmer teams and structured programming are among the aides at the users disposal if he would only employ them, Henson sid. Of all IBM system users, only one in seven uses interactive programming capabilities to solve problems, he noted.

Application program report generators can reduce by two-thirds the number of code steps required in a program and yet they aren't used. Instead, users continue to let an average of 85% of their programming costs be tied up in maintaining this software, Henson suggested.

The problem of efficient applications development "is serious' and "a major inhibitor to all computer users and thus to economic growth," he said.

On the other hand, the application of tools in program development should be dictated by economics, he added. "It costs more to develop and debug applications than to run them for their lifetime," Henson said, noting that 46% of IBM's programs require 2% of its computer capacity.

"It doesn't make sense to spend resources on fine tuning systems given the cost of the software development to be accomplished on them," he said.

Henson concluded that any progress in the area of applications development and hence in the growth of computing must come thorough discipline rather than breakthroughs. Programming is not an art "so individualized that it cannot be broadly controlled," Henson stressed. It must be viewed as a "pragmatic discipline" requiring a "good allocation" of resources, he added.

Henson looks to the mid-1980s and the development of automatic programming to assist the development of applications.

Auerbach suggested growth in the use of computers will stem from lower costs resulting from technological developments chiefly in the area of memories. He believes that in the next few years, users will see the cost of their processing power and internal memories diminish by one-third as the industry reaches the point at which more than a million circuits can be packed onto a chip.

The user cost of processing power and disks will go down two-thirds because of the increased densities of information that will be recorded, he predicted.

Read-only memory (ROM) promises to make the use of firmware more widespread, Auerbach said, adding that he expects the cost of reprogramming to decrease, given electrically programmable ROMs now being developed.

Both charge-coupled devices (CCDs) and bubble memories will depend on how suitable the programming is that accomplishes them, Auerbach stated. These techniques must be shown to be competitive with moving-head disk memory, he added.

And Auerbach predicted that "significant improvements" are still accessible in moving memory technology in the areas of bit density, track density and access time.

Micro Challenges Tradition By Taking to the High Seas

(Continued from Page 1)

The Courageous system is working "pretty well," Jorch said, adding there has been "no downtime" because of the CPU even though some downtime was experienced early in the trials because of problems with the power supply, which is fed by two automotive batteries.

Admitting that Turner was initially "very negative" about the computer system, Jorch said the helmsman is "still not in love with it" since he's a "seat-of-the-pants sailor."

However, Turner has come to accept the system because it proved its worth and reliability during the grueling summer of trials for the cup, Jorch said. "He panics a little" now if the system fails to work or an instrument goes out.

Jorch, on the other hand, is very comfortable with computer systems since he is a senior engineer in computer equipment design for Grumman Aerospace Corp. when not sailing.

In one example of the system's value, Jorch said that in an early race the power went down — and Courageous lost 20% of the lead it had gained at that point, even though it went on to win the race.

The system basically provides the navigator with position and speed information, including readouts on wind direction and speed, speed through the water and position on the course.

Previously all of these things had to be hand calculated by the navigator, taking up almost all of his time and providing less accurate information.

For example, even what would seem to be a relatively simple calculation — speed — is difficult in choppy seas aboard a 12-meter yacht. Each wave either boosts or slows the speed of the boat to some degree; with manual systems, the navigator has to use his judgement to try to determine the exact speed of the boat on the course.

The computer system, however, is constantly measuring the speed and calculating the averages, giving a more accurate readout, Jorch said.

Wind direction is another complex calculation handled by the system. About 60% of an America's Cup race is sailed into the wind with the boats tacking toward a mark.

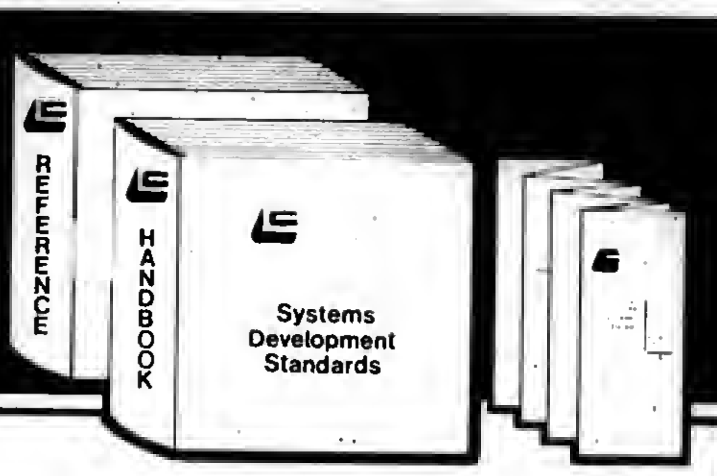
There is an optimum angle that each boat can sail toward the wind. If the boat tries to sail closer than that angle, its speed slows; if it sails at a wider angle, it may actually go faster, but have a longer distance to the mark.

It is therefore extremely important for the navigator and helmsman to know the "true" wind direction at all times.

The computer system computes the boat angle and speed and adjusts for these in order to give the navigator a readout of the true wind direction, Jorch said.

Although computers are being used more widely here this year than ever before — with the Swedish yacht Sverige and another American contender, Independence, sporting computer systems, almost identical to the one on board Courageous — they have played a minor role in past races.

Beginning in 1970, attempts were made to use rather primitive analog computers for wind direction calculations, Jorch said, and in the 1974 series a Data General Corp. Nova system was installed aboard Courageous, which was the American boat then also.



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After 'Unfair Treatment' Charges

State Picks New Group to Weigh Medicaid Bids

By Ann Dooley
CW Staff

BOSTON — A new selection committee has been chosen to evaluate bids for a state Medicaid system because the previous choice was disqualified after other bidders charged they were treated unfairly during the original selection process.

Blue Cross/Blue Shield of Massachusetts was originally awarded the $19 million contract with a subcontract to Electronic Data Systems, Inc. (EDS). When other bidders complained of "unfair treatment," a review board was established to examine the selection process [CW, Aug. 8].

The board determined that some of the complaints were valid and recommended that Gov. Michael S. Dukakis reopen the bidding.

The new selection committee, is already beginning work, according to chairman William O'Connor, assistant secretary of the Department of Administration and Finance (A&F). The other four members of the board are state employees, contrary to the hopes of some critics who felt members of the private sector should be included in the selection process this time.

Bidders Try Again

According to O'Connor, four of the five original bidders are bidding again — Blue Cross/Blue Shield; Pilgrim Health Applications, a subsidiary of Arthur D. Little, Inc.; Planning Research Corp. and System Development Corp.

Only Citibank is not trying a second time.

The committee, which acts in an advisory capacity to the Secretary of A&F, will probably not have an opinion ready for several months, O'Connor said.

Rebidding procedures are moving slower in another controversial state contract, that one involving a $23 million facilities management contract almost awarded to EDS [CW, Aug. 15].

The A&F contract was halted when the State Attorney General disclosed conflict of interest between EDS and Sci-Tek Associates. Two members of the selection board that awarded the job to EDS were also employees of Sci-Tek, a firm involved with EDS in a Tennessee contract.

The companies wishing to bid again on that contract must wait for a new selection committee to be formed. But the formation of that committee hinges upon what a conflict-of-interest investigation by the Attorney General may reveal.

The investigation is expected to continue for several more weeks.

EDS has stated it did nothing wrong in working in a joint business relationship with Sci-Tek. EDS said it had questioned Sci-Tek on the propriety of their arrangement before entering into the relationship, officials said, and Sci-Tek checked with the state and was told there would be no problem.

Relationship Okayed

The relationship between Sci-Tek and EDS on the contract in Tennessee had been approved by the state before EDS had entered its bid, John Buckley, A&F secretary, admitted.

Because the award of the Massachusetts contract was delayed, the two contracts were being negotiated at the same time and that plays a large part in the conflict-of-interest charge, Sci-Tek officials claimed.

Backus Receives Turing Award

NEW YORK — The Association for Computing Machinery (ACM) recently named John Backus the recipient of the organization's 1977 Turing Award.

Backus, an IBM Fellow at the Research Center in San Jose, Calif., was selected for his "profound, influential and lasting contributions to the design of practical high-level programming systems, notably through his work on Fortran," the award committee said.

The $2,000 award is ACM's most prestigious award for technical contributions to the computing community.

Development of Fortran

Backus headed a small IBM group in New York City during the early 1950s that developed "a high-level language for scientific and technical computations called Fortran," ACM continued. The group also translated the programs into machine language using "novel optimizing techniques" to generate fast machine language programs.

The award recipient also served on the international committees that developed Algol 58 and Algol 60, a later version. Algol received "broad acceptance in Europe as a means for developing programs and as a formal means of publishing the algorithms on which the programs are based," ACM continued.

Backus' present work concentrates on the foundations of programming languages in order to understand the simplest elements needed to build a programming language.

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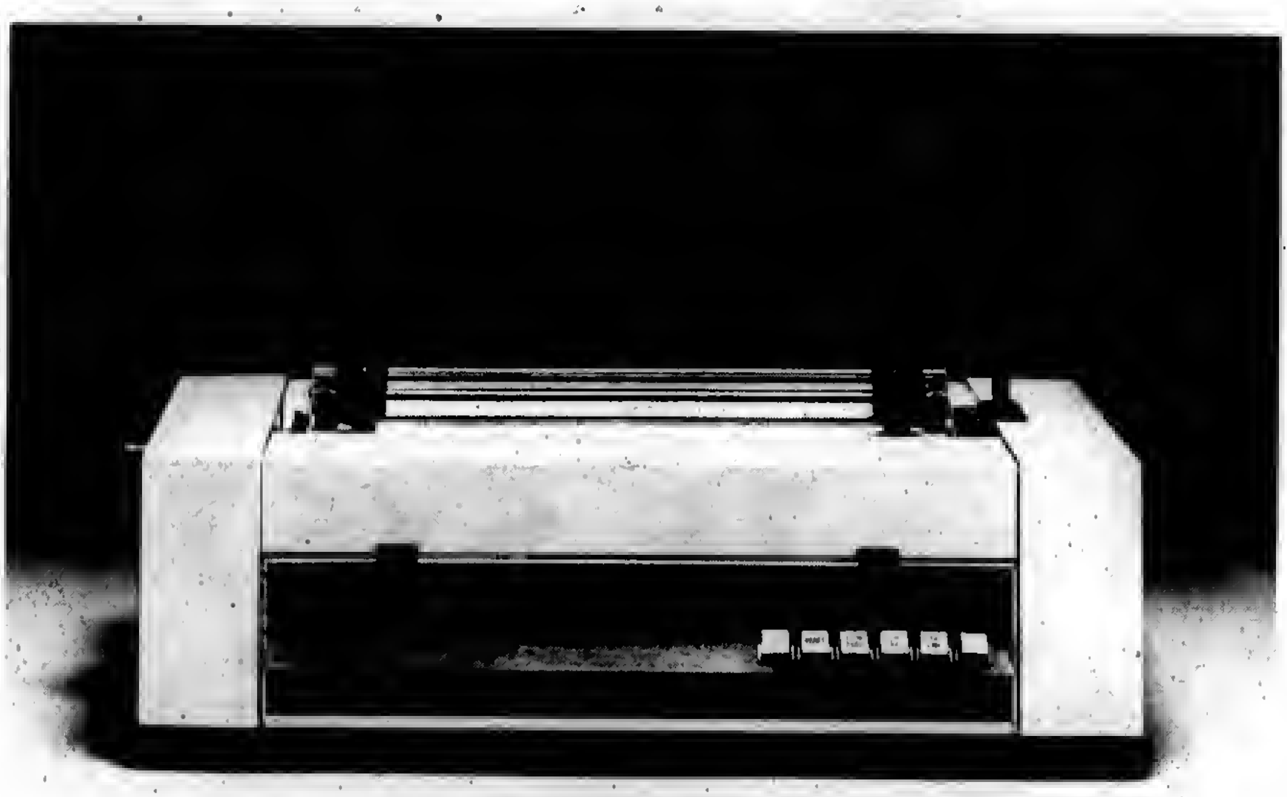

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To Integrate Budgets, Accounting

Financial System to Straighten N.Y.'s Books

By Catherine Arnst
CW Staff

NEW YORK — New York's financial crisis of the past two years finally forced the city to design its first centralized financial management system, although the suggestion for one had been made at least two years earlier.

Jan Lodal, executive vice-president of American Management Systems, Inc. (AMS), designer of the system, had worked on New York's payroll system prior to the fiscal crisis in 1975 and had written studies suggesting an integrated centralized system.

When state and federal laws connected to the city's financial rescue required such a system be built, AMS was contacted again because "those studies proved right," Lodal said.

After 18 months of design and development, New York's Integrated Financial Management System (IFMS) was installed by AMS July 1.

IFMS will integrate the city's budget and accounting applications for all its agencies and the end result should be auditable financial statements for the fiscal year ending June 30, 1978.

The system runs on two IBM 370/158s and there are about 200 Genesis One G77 CRT terminals tied into the system, which allow agencies to retrieve information but not alter or input any data. All data is currently entered in a batch mode on 35 IBM 3277 terminals in a central location. Eventually, some data will be remotely entered, Lodal said.

6 Billion Bytes Storage

The system currently has 6 billion bytes of direct access storage available which will be expanded to a maximum of 12 billion. The system costs $16 million and is budgeted to operate at a cost of $10 million annually.

Prior to IFMS, New York's only automated financial systems were its budget, accounting and payroll systems. However, these were not integrated, according to Steven Clifford, special deputy comptroller. "There were a whole bunch of important functions that weren't being done," he added.

In December 1975, a report by Arthur Andersen & Co. highlighted some of the weaknesses in those systems. Among those cited were: lack of controls in the overall accounting systems and procedures; fund control structures that were not useful for control of revenues, expenditures and fund balance; expenses for contracts that were not recognized until vouchers were processed.

In addition, bank balances were not reconciled for several years and information on cash balances maintained by the comptroller and the director of finance differed by several million dollars.

One of the city's problems was that the comptroller and the mayor "were usually at each other's throats," Clifford said. To overcome that lack of cooperation, the Financial Information Services Agency (Fisa) — which is equally controlled by the comptroller and the mayor — was set up to administer the new system.

AMS was chosen to develop the system because Clifford had worked with it before and believed its personnel to be "the only people who could handle the job." City personnel and accountants from Touche Ross and Co. worked with AMS on the design.

Strapped for Time

"Our biggest problem was too little time," Lodal said. The systems contract was issued in September 1975 and the system had to be installed by July 1, 1977. That deadline was established by federal law.

"Almost nothing could be salvaged" from the existing systems and the city's accounting data was not in a standardized form. The city also never kept any inventory records of fixed assets, he added.

There was no time to accommodate the special needs of the different city agencies, Lodal said. Clifford described the system as a "top-down design. It had to be; with only 18 months to deliver.

"There was not as much input from agencies as would be expected. I wish the agencies had been more concerned," Clifford said. The result has been "numerous clerical problems and some grumbling, but I haven't paid any attention."

The system did start on schedule with only the usual start-up problems, Clifford said.

"As a big on-line system it's certainly not systems state-of-the-art — we had no time to be daring. But we do think it is applications state-of-the-art," Lodal said.

He added that no other city has a financial system of such size and flexibility, but "New York needs the best and fanciest because of its size."

The system issues about 200 reports, through an automated report distribution system, to about 2,000 separate user groups, allowing agencies for the first time to analyze their own financial data, Clifford said.

The programming is done in Cobol and operates under an information management system (IMS) which gives it great flexibility, Lodal said. Everything in the system is controlled by master tables which are core-resident but available to the system. This makes it very easy to use.

Afips Updates 1973 U.S. DP Summary

WASHINGTON, D.C. — Computer technology is a "nonscarce" national resource that is relevant to a broad range of policy questions, according to an American Federation of Information Processing Societies (Afips) study which is scheduled for release in October.

Updating a 1973 report by Afips, *Information Processing in the United States: A Quantitative Summary* estimates that the total computer labor force is 853,000 people.

While the insurance and banking industries have the largest number of firms using computer equipment or services, the manufacturing sector is the biggest computer user in the U.S. in terms of the amount spent on equipment and services, the Afips study found.

The report, which has already been presented to the White House Office of Science and Technology Policy, predicts that U.S. firms' world computer manufacturing and services revenues will double from $31.9 billion in 1976 to $64.0 billion in 1981.

Meanwhile, world computer equipment shipments for U.S. companies will also double from $15.9 billion in 1976 to $30.5 billion in 1981, Afips said.

Finally, the study shows that while the percentage of gross national product spent on computer usage in the U.S. is increasing dramatically, the amount spent per capita is increasing at an even faster rate.

The 85-page report updates the previous Afips study, entitled *The State of the Computer Industry in the United States.*

Intended to provide summary data on the information processing field, the report will be publicly available next month from Afips headquarters at 210 Summit Ave., Montvale, N.J., for $6.00 per copy.

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Programming Called 'Natural' Field for Blind

By Mary Kincaid
Special to CW

"Computer programming is a natural field for blind students to enter," according to Joyce Van Tuyl, a California transcriber whose braille transcriptions have launched a number of blind students into advanced math careers.

Van Tuyl, along with a band of other volunteers, has been a member of the California Sixth District State PTA Braille Transcription Project since 1968. A graduate of the University of Michigan College of Engineering, her sympathies lie with the thousands of gifted, intelligent blind young people who are inclined toward math and science. This is a group often turned away from their field of interest by counselors, who themselves may find math and science "impossibly difficult" and, therefore, unappealing.

Van Tuyl, who is fully sighted, signed up for the first adult education class in braille offered in Palo Alto in 1956. It was a providential choice. The tasks involved were intellectually stimulating and rewarding, and the need for trained personnel to learn the alphabet and the technique of transcribing it by machine was urgent.

15% Know Braille

Although braille transcriptions enable the blind to read textbooks, enrich their lives by reading the world's best literature, or follow new recipes from gourmet cookbooks, only 15% of the blind population knows how to read braille.

There are several reasons for this surprising statistic. Those who become blind as adults are often defeated by the enormity of their misfortune. They simply don't have the will to try to learn. On the other hand, the optimists don't want to learn because they believe their blindness is temporary.

In addition, many blind people are diabetic. They often have a reduction of the sensation of touch, preventing them from using their fingertips quickly to sense the pattern of raised dots that form the braille alphabet and other braille symbols.

During the '50s, better braille code was designed for math. The old math symbols, with positions both above and below line, and the incorporation of several foreign alphabets had prevented transcribers from using them in the rigidly coded single-line braille system used for text.

In 1952, Dr. Abraham Nemeth, now a mathematics professor at the University of Detroit, devised a way to adapt the existing braille system to incorporate modern math symbols.

Logical Link

"Computer programming," Van Tuyl said, "is a natural field for intelligent blind students, because from childhood on they have had to organize and systematize every aspect of their lives: Socks, kitchen utensils and furniture are all placed in specific places for ordered and efficient use. This is exactly the systemized procedure in which computer programmers must be trained to think. That practice sometimes even puts them ahead of sighted programming students."

A number of young Californians for whom Van Tuyl had transcribed textbooks have grown up and gone on to study advanced math. One boy received his BA in math at Stanford University, then took a Masters in operational research. Another of her students is now doing graduate work in computer science at Georgia Tech.

The Braille Transcription Project, sponsored by the Sixth District California State PTA, has been in operation for 21 years, not only training volunteers in transcription, but also in recording texts on tape.

Before a transcription is begun, a search is made with the American Printing House for the Blind, in Louisville, Ky., to see whether the requested text is already available. If not, a volunteer is assigned to the task.

Volunteers work at home on small machines that transform printed words into the raised dot patterns on paper. If that material is to be made into a book, these pages are duplicated a second time on more durable plastic sheets that will withstand the pressure of the readers' fingertips for a longer time.

Understandably, more pages and more labor hours per page are required to produce a book in braille than in print. The Transcription Project has produced such time-consuming volumes as Roget's *Thesaurus*, that in braille requires 45 volumes. A special system is used to transcribe music.

The project receives no funds from any governmental source. The thousands of hours per book are donated entirely by volunteers except for the paid work done by the blind proofreaders.

The Education for All Handicapped Children Act, passed in 1975, grants all children the right to a free public education. The federal government will now underwrite only 5% of these costs, but by 1982 will supply 40%. In the meantime, volunteers are needed.

Those interested in contributing to the cause may write to the National Braille Association, 85 Godwin Ave., Midland Park, N.J. 07432, or to the California Transcribers and Educators of the Visually Handicapped. Gifts and Tributes Chairperson for the latter is Margaret Parenty, 1103 Ortega Rd., Pebble Beach, Calif. 93953.

Kincaid is *a freelance writer from Ann Arbor, Mich.*

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CRTs Help Drive-In Tellers Catch Forgers Red-Handed

Photos by Steve Stibbens

Drive-in teller uses a terminal from Signature Technology, Inc. of Dallas to verify signature.

LAKEWOOD, Colo. — Signature verification terminals in use by tellers at Jefferson Bank & Trust here are reportedly proving their worth in stopping forgers.

In the first four months after 52 Informer, Inc. Model 301 terminals were installed, Jefferson Bank's drive-in tellers caught three forgers red-handed, according to Sam Blackman, vice-president of customer operations.

When the tellers saw that signatures on checks averaging $600 each failed to match up with the authorized signature displayed on their mini CRT, they questioned the forgers.

Foiled in their attempt, the forgers sped off — but not before tellers copied their license numbers.

Teller in lobby calls up a signature from the bank computer's disk files for display on a 6-in. CRT.

The tellers kept the bad checks and the bank's money. Police got the forgers.

On-Line System Saves Lawyers Research Time

SAN DIEGO, Calif. — Law students and lawyers here can now save an estimated 70% in research time using Westlaw, a computer system that provides a list of past court cases on almost any subject.

Installed at Western State University College of Law about a year and a half ago, the computer facility communicates via an IBM 3275 CRT on-line to an IBM 370/158 located at the national Westlaw system in St. Paul, Minn.

The system contains summaries of every reported decision since 1967 for all state courts and from as far back as 1961 for all federal courts, according to James O. Werner, law librarian.

Westlaw retrieves information in summary form when an inquiry is keyed into the system and can save as much as a day of examining law reference books, Werner said.

The response to the system has been very enthusiastic, Finz said. People who have a prejudice against computers would change their minds once they tried the system, he said.

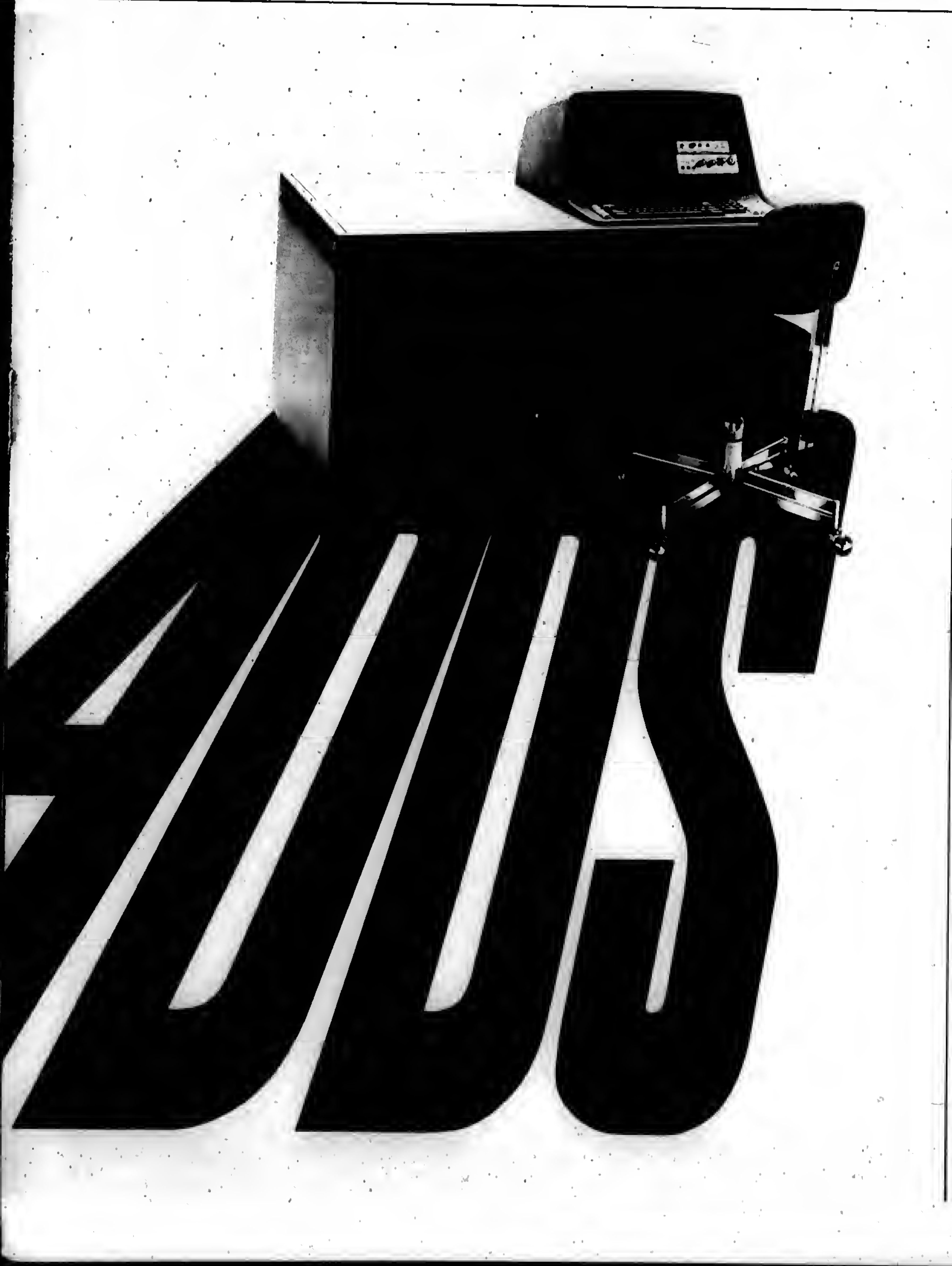
Westlaw is supplied by West Publishing Co. of St. Paul.

Liu, Ghosh to Take NCC Program Posts

MONTVALE, N.J. — Dr. Leonard Y. Liu, manager of the Computer Science Department at IBM's San Jose Research Laboratory, has been named chairman of the 1978 National Computer Conference (NCC) professional program. He will be responsible for the overall planning and implementation of the conference, to be held June 5-8 at Anaheim, Calif.

Dr. Sakti P. Ghosh, research staff member at the laboratory, has been appointed program vice-chairman.

The 1978 NCC is sponsored by the American Federation of Information Processing Societies, Inc. (Afip). Further information can be obtained by writing NCC '78, c/o Afips, 210 Summit Ave., Montvale, N.J. 07645



Editing System Expected to Save House $2 Million in Printing Bills

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The U.S. House of Representatives estimates it will save over $2 million in printing legislative bills this year as a result of an electronic publishing system installed in April.

Operated by the House of Representatives Information Systems (HRIS) staff as a joint venture with the Committee Reporters' Office, the Committee on House Administration, several House committees and the Government Printing Office (GPO), the system is intended to cut the cost and time involved in converting hearings and committee reports to print.

After three months of limited operation, HRIS determined it had already saved the cost — $638,200 — of the Atex, Inc. CRT terminal-oriented composition and editing system, a spokesman said.

Using a Digital Equipment Corp. PDP-11 minicomputer to capture, edit and print transcripts, the system has reduced the average time required for printing hearings from more than three months to less than 20 days.

For example, the system made it possible for the House Ad Hoc Committee on Energy to print its June hearings within four working days after they were held, the Committee on House Administration reported.

The GPO can actually produce the original page copy for printing the same day a hearing is held, the spokesman noted.

Used by 19 House committees to prepare more than 250 transcripts and print more than 30 documents, at midsummer the Atex system resulted in a direct savings to taxpayers of $73.62 for each page that was composed electronically. The old hot-metal method of composing text costs $76.86 per page, while the new approach has averaged only $3.24 per page so far, including House and GPO personnel, labor and material costs, the GPO found.

The House figured it had to print a total of 8,669 pages before the equipment was paid for and real savings were received. As of July 15, the House had 8,664 pages ready for typesetting, the spokesman said.

The spokesman noted that the system has unexpectedly provided savings in another area as well: it has increased the speed and efficiency of the Committee Reporters' Office. The terminals have enabled more committee reporters to cover more hearings.

The House has not had to spend approximately $100,000 on commercial reporting services since the system has been in operation as a result of this increased reporter efficiency, the spokesman said.

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Kit Offers Tips For Job Hunters

PALO ALTO, Calif. — ETC Business Services is offering a resume kit to professionals seeking jobs.

It contains a form with complete instructions for writing an effective resume, sample resumes, an article, "Guide to Professional Employment," and instructions for interview preparation.

The kit costs $5 from ETC Business Services at 484 Lytton Ave., Palo Alto, Calif. 94301.

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Calendar

Oct. 6-7, Washington, D.C. — **Humanized Technology for EDP Management** by Tom Gilb. Also being held Oct. 10-11, Chicago; Oct. 13-14, Toronto; Oct. 20-21, Seattle; Oct. 24-25, San Francisco; Oct. 27-28 Houston. Contact: TSI Sales and Marketing, Inc., 19 W 44th St., New York, N.Y. 10036.

Oct. 6-8, Tokyo — **International Conference on Very Large Data Bases**. Contact: Prof. Stuart E. Madnick, Conference Chairman, Center for Information Systems Research, Alfred P. Sloan, School of Management, Room E53-333, MIT, 50 Memorial Drive, Cambridge, Mass. 02139.

Oct. 9-12, Boston — **Common Fall Conference.** Contact: David G. Lister, Administrative Director, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Oct. 9-15, Atlanta — **Intelcom** 77. Contact: Barbara Coffin, Promotion Manager, Horizon House International, 610 Washington St., Dedham, Mass. 02026.

Oct. 10-15, Chicago — **National Communications Forum — National Electronics Conference.** Contact: National Engineering Consortium, Inc., 1211 W. 22nd St., Oak Brook, Il. 60521.

Oct. 11-12, New Carrollton, Md. — **11th Annual Instrumentation & Computer Fair**. Contact: Liz Wahl, Program Coordinator, 11501 Huff Court, Kensington, Md. 20795.

Oct. 11-14, New Orleans — **13th Meeting of the Computer Performance Evaluation Users Group**, sponsored by National Bureau of Standards (NBS). Contact: Dennis M. Conti, NBS, A265/Technology Building, Washington, D.C. 20234.

Oct. 17-19, Seattle — **Association for Computing Machinery (ACM) 77 Conference**. Contact: Dr. James S. Ketchel, General Chairman, P.O. Box 16156, Seattle, Wash. 98116.

Oct. 17-19, Los Angeles — **New Tools and Techniques for Manufacturing Management,** sponsored by the American Institute of Industrial Engineers. Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 17-20, New York — **Information Management Exposition & Conference — Info 77.** Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Oct. 18-19, King of Prussia, Pa. — **Second Annual Instrumentation & Computer Fair**. Contact: Liz Wahl, Program Coordinator, 11501 Huff Court, Kensington, Md. 20795.

Oct. 18-21, Newport Beach, Calif. — **Semiannual National Meeting of the Comten User Exchange.** Contact: Edwin F. Hart, Applied Physics Laboratory, Johns Hopkins University, Laurel, Md.

Oct. 19-21, New York — **How to Prepare Airtight Computer Contracts.** Contact: Radley Communications Ltd., 509 Madison Ave., New York, N.Y. 10022.

Oct. 19-21, San Francisco — **1977 Fall Conference of the Association of System 2000 Users for Technical Exchange.** Contact: Edward B. Denson, Illinois Central Gulf Railroad, 233 N. Michigan Ave., Chicago, Il. 60601.

Oct. 23-26, Detroit — **Business Forms** 77. Contact: National Business Forms Association Program Coordinator Julie C. Davis, 433 Monroe Ave., Alexandria, Va. 22301.

Oct. 25-26, New York — **Conference on Electronic Mail,** sponsored by Yankee Group. Contact: Carolyn Matthews, P.O. Box 43, Cambridge, Mass. 02138.

Oct. 25-27, Compeigne, France — **International Federation of Automatic Control (IFAC) Workshop on Information and Systems**, sponsored by Association Francaise Pour la Cybernetique et Technique. Contact: Prof. B. Duboisson, Universite de Technologie de Compeigne, B.P. 233, 60206 Compeigne Cedex, France.

Oct. 25-26, Washington, D.C. — **Advanced Structured Techniques**. Contact: Infosci Inc., Box 7117, Menlo Park, Calif. 94025.

Oct. 25-27, Anaheim, Calif. — **Electro-Optics/Laser '77 Conference & Exposition.** Contact: Technical Program Coordinator, Electro-Optics/Laser '77, 222 W. Adams, Chicago, Ill. 60606.

Oct. 26-28, Minneapolis, Minn. — **Educom Fall 1977 Conference: "Closing the Gap Between Technology and Application."** Contact: Educom, P.O. Box 364, Princeton, N.J. 08540.

Oct. 28-30, New York — **Personal Computing Expo.** Contact: Ralph Ianuzzi, Show Manager, H.A. Bruno & Associates, Inc., 78 E. 56th St., New York, N.Y. 10022.

Oct. 31-Nov. 3, Detroit — **Computer-Aided Design and Computer-Aided Manufacturing Conference and Exhibit.** Contact: Tom Akas, Society of Manufacturing Engineers, Box 930, 20501 Ford Road, Dearborn, Mich.

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Editorials

Do We Really Need It?

For years we have questioned the worth of the Federal Bureau of Investigation's computer-based National Crime Information Center (NCIC).

Now an independent panel of the Scientists' Institute for Public Information (Sipi) has also questioned the overall efficiency and effectiveness of the computerized system.

The earlier criticisms were mainly about the procedures used by the FBI to ensure that the racords contained in the system were both up-to-date and accurate.

Those criticisms are still valid, according to the new report.

But even more disturbing is the fact that Sipi concluded the system may not even be effective for its stated purposes.

For a "vast system, containing over six and one-half million records with 250,000 transactions per day, the 'hit' ratio was not demonstrated to be impressive.

"The actual henefits of NCIC still remain in the area of surmise, rather than demonstrated results," the report said.

In the past, many proponents of the FBI's system have argued that those benefits do outweigh the occasional violations of privacy and human rights that occur.

But now, even those benefits ara apparantly in doubt.

If the NCIC is as inefficient as charged even the arguments of efficiency are no longer valid — and clearly the system cannot be justified on its privacy record.

The NCIC should be taken out of the hands of the FBI immadiately and be constituted as a neutral independent agency such as that proposed by the original Project Search committee in the early '70s.

At the same time, the entire operation should be studied objectively and those parts which are found to be the most inefficient should be dropped out of the system.

As long as the NCIC is part of the FBI, that agency will continue to function more liko a national police force than like the federal investigative agency it is supposed to be.

If the NCIC is divorced from the FBI, that agency will be freed to do the job it was established to do — and the overtones ot "big brotherism" will be decreased.

And an independent study may find that we need no NCIC at all — finally.

Users Deserve to Know

IBM reportedly has several thousand orders for its 3033 processing unit — a CPU that clearly offers price/performance benefits for users.

At the same time, however, reliable reports both in the press and the user community indicate the firm will only build 800 to 1,000 of the units, which are not scheduled for initial delivery until next year.

Obviously, some users aro going to be disappointed when they find they are not scheduled to get their 3033s for quite a while.

IBM should immediately let users know when they can expect delivery of the new unit, so that users can make appropriate plans — including the 3033 or some alternative mainframe.

By playing it cozy with delivery dates, IBM will only serve to alienate more users than it satisfies.

Data Past

Five Years Ago
Sept. 20, 1972

WASHINGTON, D.C.— A draft revision of the 1968 Cobol standard was completed by the American National Standard Institute (Ansi) technical committee X3J4. Users were urged to comment before Ansi's full X3 Computers and Information Processing Committee began its formal consideration of the proposal. Under the plan, there was to be a nucleus and 11 functional processing modules in the complete ANS Cobol, rather than eight.

— — —

DES MOINES, Iowa — Des Moines police kept secret computerizad intelligence files on "persons of interest" for more than a year, and although some of the suspects were never convicted of any crime, the reports labeled the individuals as "known criminals." The descriptions could be made available, upon request, to law officials throughout Iowa, as well as police, FBI agents and other officials across the country.

Eight Years Ago
Sept. 24, 1969

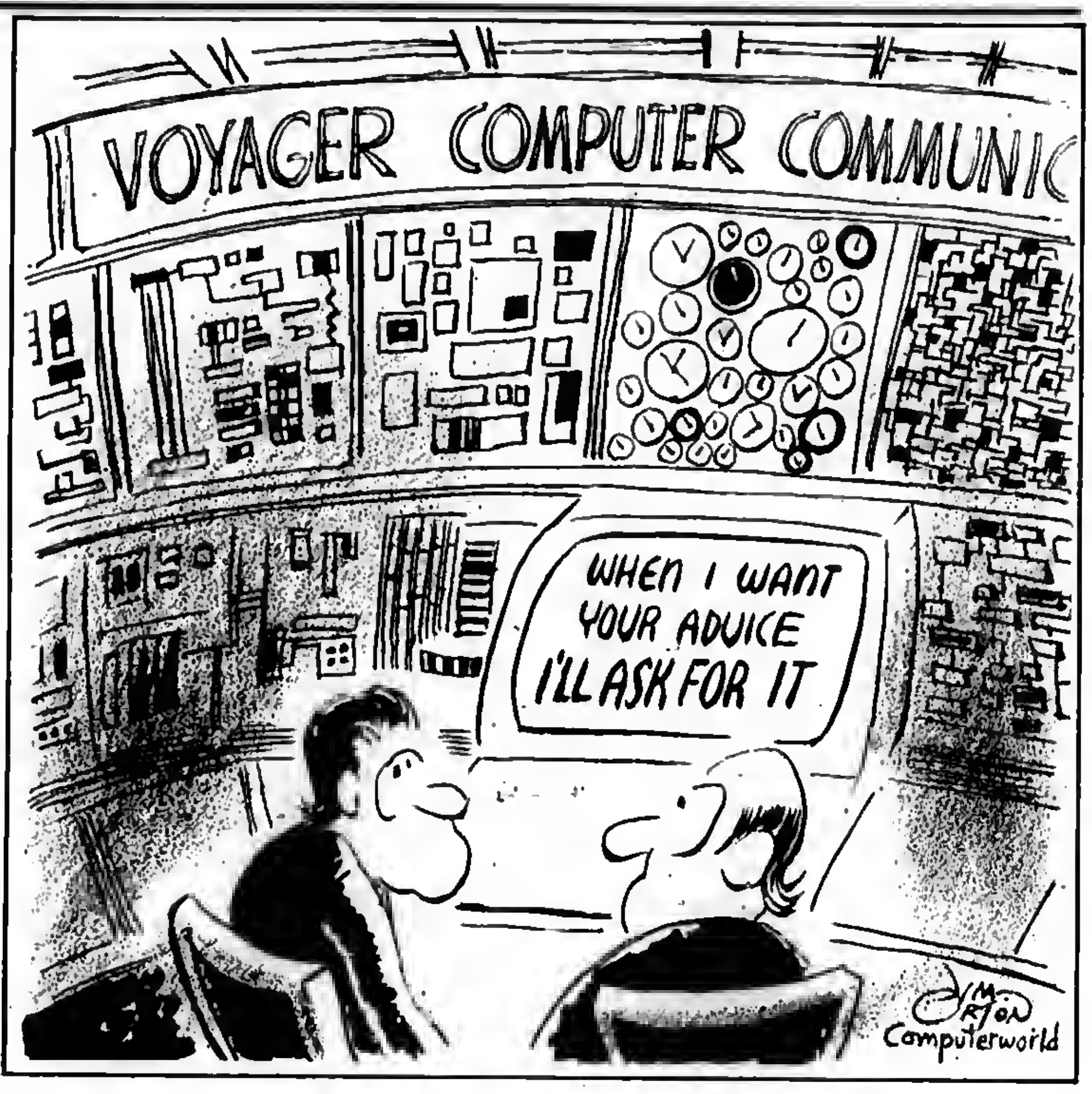
Control Data Corp. separated the pricing of its hardware, software and services. At the same time, CDC announced a price increase averaging about 5% on hardware and maintenance.

General Electric, just before the CDC announcement, said it would not further separate the pricing of hardware, software and servicas. GE also announced price increases ranging from 3% to 5.1%.

— — —

NEW YORK — A microfilm retrieval system that made use of a remote time-sharing computer was damonstrated here.

The system, developed by DSI Systems, Inc., made it unnecessary for the user to have an in-housa computer available to retrieve documents from microfilm files. It was also much cheaper than maintaining data on tape or disk either in-house or at a service bureau, according to the company.


VOYAGER COMPUTER COMMUNIC
WHEN I WANT YOUR ADVICE I'LL ASK FOR IT
Jim Orton
Computerworld

Letters to the Editor

Stronger, But Not Faster

I was somewhat amused by the implication in the article on the Voyager II computer problem [CW, Sept. 5] that the installation of the largest disk antenna ever used is resulting in a decrease in radio wave propagation time.

The size of the antenna, of course, will not affect propagation time. The increased distance involved requires that a stronger radio signal be transmitted in order that the signal strength, as received at the Earth, will be sufficient for reliable reception. The larger antenna effectively results in the transmission of a stronger signal.

Robert E. Hubbard
Lakeland, Fla.

Cartoonist Needs Debugging

Jim Orton's cartoon about copyrights, on the editorial page of the Aug. 22 issue, looks like sour grapes to me.

The cartoon seems to imply that copyright lawyers who know something about DP are only interested in the money they can collect for rendering services to data processors by obtaining copyrights for them. I wonder how Orton ever developed such a notion.

It is easy for a data processor to obtain copyrights without the aid of a copyright attorney. All he has to do is write to the Register of Copyrights in Washington, D.C., and ask for a set of instructions and then follow them.

But a copyright lawyer familiar with DP can sometimes make the process simpler and less expensive.

There is a lot more to copyright law and program protection than just learning how to register a copyright, just as there is a lot more to programming than just reading a programming manual. There is a role for copyright lawyers, as well as programmers and even cartoonists, in society.

Let us debug your cartoonist.

Reed C. Lawlor
Los Angeles, Calif.

IBM Sales in South Africa

An article in the Aug. 22 issue ["South African Users Tighten Belts"] implies that some IBM sales to Anglo-American Corp. in South Africa are inconsistent with a statement I made at our annual stockholders' meeting. That is not true.

What I said at our annual meeting was that IBM would not bid any business where we believe our products are going to be used to abridge human rights. We are satisfied, from the knowledge available to us, that the application mentioned in no way abridges human rights.

Frank T. Cary
Chairman of the Board
IBM
Armonk, N.Y.

Rigo 'Mandatory Reading'

Congratulations to Joe Rigo on his letter to Ken Lord in the Aug. 29 issue. Joa, I wish I had been the one to say what you said regarding the Certificate in Data Processing (CDP), the Certificate in Computer Programming (CCP), the Code of Ethics and professionalism in general in the data processing industry. This was one of the best reader commentaries I have read in the 12 years that I have been in the business. I have made it mandatory reading for my entire DP staff.

I agree with you that the Carmine Vonas of the world neither want nor need the CDP or CCP titles because they neither help nor hinder those people. Those who do need these titles will never be the Carmine Vonas of the world.

David A. Reser
Long Beach, Calif.

Meet Reveals DP Team Research 'Alive'

The Human Connection

By Jack Stone
Special to CW

Would you believe it? Several hundred data processing people plus a handful of sociologists and psychologists working beautifully together!

You and I both know that it was not a large-scale systems development project. The occasion was the annual meeting of the Association for Computing Machinery (ACM) Special Interest Group on Computer Personnel Research (SIGPCR), which spent two days in August grappling with the toughest set of problems facing DP management today — getting DPers to work and communicate together with other DPers — and users — and executives.

And what a job they did! In my opinion, it was the best organized and most meaningful conference of its kind.

I thought it might be useful to offer some general observations I made about the gathering and then discuss just a few of its many, many highlights.

First, I was very impressed to learn that so many projects dealing with DP team development have left the behavioral science laboratories and are now under test in "live" situations.

Second, I was rather overwhelmed with the quality and diversity of the topics covered in the conference. (This is a fancy way of saying that I felt like a rank amateur in this crowd.) But how knowledgeable are you about these ideas that were discussed?

They included structuring the organization "climate," "synergistic" EDP teams, the computer "job environment model," the theory of DP organization behavior and group effectiveness, the "creeping commitment" phenomenon, team "constituency," the DP "inspection team," "organic-adaptive" DP management, and "pluriprogramming"!

Third, there was a strong undercurrent of humility among the speakers and the audience. Most of the attendees seemed to feel, as did I, that the conference was breaking new ground in this most crucial field and a gigantic job lies ahead, but the effort is underway.

Now for a sprinkling of some of the high points.

Alonzo Grace of A.G. Grace and Co. has studied the application of the concepts and practices of structured programming to management problems In general, and DP systems management problems in particular. He observed that the recent stories of structured programming successes that have appeared in the literature have all involved productivity gains of *small* groups of people.

He has addressed the question of improving the productivity of the large DP organizations, seeking not the order of magnitude improvements that have been reported but rather a more modest 10% improvement per year sustained over several years. His approach is to view the productivity project as a systems problem to be attacked in an organized way.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

However, he was quick to note that, for the large organization, a productivity project may be far more complex than any DP systems project because many DPers are not inclined to take DP organization strategies seriously enough.

Nancy Anderson and Ben Shneiderman of the University of Maryland talked about the use of peers, rather than managers, for the evaluation of the "quality" of programs. Their idea is to conduct an annual or semiannual review, administered by a practicing programmer. The review is not for the purposes of determining promotability or salary, but, for programmer education, improving cooperation and communication in the team, and self-evaluation. They are supportive of this approach in part based upon the practices of other professions, such as medical, psychological and academic, who typically use peer review boards to evaluate the quality of their work.

Philip Semprevivo, with the computer center of the State University of New York at Albany, presented some novel (to me, anyway) observations about team approaches to systems development. He noted, for example, that there is not, in practice, the team approach. Instead, there appears to be a wide variety of possible approaches.

The existence of this diversity derives from two factors. The first relates to the actual breakout of group vs. individual work, since the fact that a "team" has been organized does not necessarily mean the people will actually engage in group work activities.

The second relates to the notion of team "constituency" which helps to define the actual composition of the team, taking into account the formal versus informal modes of operation. He made explicit reference to a well-known adage (which we all ignore in practice) when he stated, "Groups whose organizations appear to be the same may possess very different informal organizations which affect dramatically the ways in which they operate."

David Skeen, with the Office of Naval Research, provided a thoughtful analysis of the involvement of users with DP systems development. In his introduction, he neatly identified the three major problems underlying the unending failures of software development projects when he said: "DP did not understand the area of application, the user did not or was not allowed to fully participate in developing the project, and commmunications between DP, the user, and top-level management deteriorated almost to the point of physical violence."

Finally, a personal note. My reason for attending the conference was to listen quietly (sometimes difficult for me) to the real experts in the field. Imagine my surprise and pleasure when Joan Franz, from the University of California, in her paper on DP group effectiveness, quoted liberally from a recent *Computerworld* article [Aug. 9, 1976] titled "DP Managers Must Stop Fire Fighting and Start Managing" written by that renowned authority, Jack Stone!

For information on SICCPR, contact ACM, 1133 Avenue of the Americas, New York, N.Y. 10036.

Loophole Crops Up on IBM/Australia Front

IBM World Trade's Ralph Pfeiffer narrowed the issues [CW, Sept. 5] but his letter showed up a loophole left by the Australian Parliament when it tried to forbid deceptive and misleading practices effective this July 1.

The Taylor Report

By Alan Taylor CDP

Apparently there is common ground in regarding any of the practices as wrong. Pfeiffer said the "Unfair Practices" section of the act is in keeping with the IBM guidelines on employees worldwide." But presumably, he would agree that what is wrong for individual employees is also wrong for the corporation itself. If so, we don't have to deal further with the question of right or wrong — merely with appropriate punishment. That simplifies matters.

However, his comment that IBM operations won't be strangled in Australia and that "It should be noted that contracts in force before July 1, 1977 are not affected by the amended act," does show up a loophole that arises from IBM's contracting techniques. It seems unlikely that the Australian Parliament was permittting any deceptive practices to continue after July 1 when it excluded contracts made before July 1. It seemed to have been seeing to it that people would not be punished for actions that were lawful when performed. Thus, any new computer or software that was ordered before July 1 presumably would not come under the Trade Practices Act.

What Pfieffer's letter draws attention to is that new computers can be announced and sold — even by deceptive and misleading practices which take place since the act went into effect — and yet may be excluded from its provisions! This is because IBM can claim that even newly announced machines are being sold under contracts that were signed before July 1 and which exclude or limit liability.

Under IBM's contracting practices, this is the normal state of affairs and apparently Pfeiffer believes that World Trade can indefinitely continue selling — outside the terms of the act — to the 312 or so current IBM installations.

Pfeiffer claimed he objects to open-ended liability for damages caused by World Trade. Apparently he wants some ceiling but does not suggest a specific one. Last April, IBM announced a new form of contracts which gave a ceiling of $100,000 or 12 monthly payments (about a quarter of the selling price) of the specific machine in question. Assuming Pfeiffer would propose a ceiling on a similar basis, let us see whether it would prevent a corporation that markets computers from profiting from deceptive practices in Australia.

The method of obtaining damages in Australia, as in most parts of the free world, is to take the matter to court. This can be expensive, and such expenses are often not under the control of the complaining party. The accused firm also has many rights under the court process and can, by perfectly proper legal

(Continued on Page 16)

What I Said Was . . .

Readers of Ralph A. Pfeiffer Jr.'s letter of Sept. 5 should know that the items he claimed I had stated are inaccurate interpretations of what I really wrote.

Pfeiffer said, "It is not true, as Taylor stated, that IBM is objecting to the 'Unfair Practices' section of the act." On Aug. 8 I wrote, "What is becoming clearer, however, is that what IBM is objecting to is Australia's action to make all firms, large and small, responsible *for damages caused by 'deceptive'* and 'misleading' conduct." It is that responsibility to which IBM still objects.

Second, Pfeiffer wrote, "Taylor also stated that IBM Australia's action could 'strangle' IBM customer operations there." In my column of Aug. 1, to show the power of IBM under its current contracts even with regard to non-IBM-owned IBM computers, I had written "Potentially, therefore, it would be possible for an IBM withdrawal to effectively strangle the use of any or all of the 312 installed IBM systems."

Letters to the Editor

Eyeing 'Big Brother Land'

All arguments and rationalizations that diminish the exclusivity of a mailing list are merely lubricants that grease the rails to "Big Brother Land."

The supposedly simple protective questions cited by Alan Taylor [CW, Aug. 15] are reduced to absurdities by their very nature. Consider the futility of attempting to define in advance those things that might "harm" or "embarrass" an individual at some future date or of predicting all the ". . . possible future uses of the information . . . "

Consider further the uselessness of the individual's being able to "withdraw approval" after some form of damage has already been done.

Obviously, if each compilation of personal data is treated as an absolutely exclusive domaln, vast redundancy and inefficiency will exist. However, bettar that than the slow erosion of privacy which (future technology permitting) must ensue if various sources of Information are exchanged and integrated until, quite logically, the entire society is included in one monolithic data base.

Sheldon J. Baer
Los Angeles, Calif.

Unjustified Assumption

Regarding the "Taylor Report" of Aug. 15, about selling DP lists, I think he has adopted the popular idea of today that all nonprofit organizations are good and all profit-oriented organizations are the bad guys.

I think this idea is too often unjustified. If, for example, the average corporate profit is about 5%, and I believe it is this or less for the latest year compiled, then similar nonprofit organizations should offer services that are at least 5% less cost per unit.

The nonprofit groups incur no property taxes, no sales taxes and no income taxes. In addition, they are entitled to reduced postage rates.

They often receive free labor from volunteers as well as discounts on purchases.

Do their services cost 5% or more less?

Robert Lumhrix
Marshfield, Wis.

STC Not Only Producer

The article entitled "STC 'Super Disk' Sales Enjoy Rapid Growth" [CW, Aug. 1] contained a glaring mistake.

In that article, it was stated "Today, the company has more than 15,000 tape drive installations and, except for IBM, is the only manufacturer in the world producing drives with a recording density of 6,250 bit/in." This is not exactly correct. Telex Corp. has also been producing 6,250 bit/in. tape drives as have both Siemens in Germany and Fujitsu in Japan.

In the OEM marketplace, Pertec Computer Corp. and Telex are also producing 6,250 hit/in. tape drives.

M.A. Lutvak
Memorex Corp.

4-Bit Word Too Short

In reading "Micro Programmers Seen Facing Old Prohlems" [CW, Aug. 15], I was struck by I. Barron's audacious suggestion of a 4- or 5-bit word.

4 bits allow 16 combinations; 5 allow 32. "English and a few numbers" indeed! Presumably, these would be numbers 1 through 6, and no spaces or punctuation.

Much data processing requires upper/lower case as well as the absolutely basic alphabet, numbers and a dozen or so punctuation marks. The minimal word length to allow this rather standard character sat is 7 bits.

Multilingual bibliographic (or any taxtual) processing really demands diacriticals, bringing the character set up to about 240-250 characters.

I would be delighted to see Barron's proposed 5-bit character set (it might handle Hawaiian). His 4-bit set should be even more instructive for English.

Walter C. Crawford
Walnut Creek, Calif.

For Conservation's Sake

In view of the current emphasis in many areas on conservation, especially in regard to DP and its use of paper, I would like to suggest what I regard as a potential for tremendous savings.

The idea is simple yet far reaching. Have the writers of language translators eliminate the needless page ejects between the EXEC card, source code, end of source code, various tables and maps, diagnostic messages, link edlt, cataloging status report and the end of job indicator.

In a typical compile, you probably have half a dozen pages with four or five lines printed on each ona. Not only are these page ejects unnecessary, in some cases they are unwantad. I would prefer to have the phase name on the sama page that the source code begins in order to eliminate confusion and possible loss of this valuable Information.

I make infraquent reference to literal pool, register assignment, field definitions and displacements, so I could care less if they do not each begin at the top of a page. What is essential is that I be able to find them when I need them, and I could still do thls with ease.

Two specific examples from my installation are:

- An 84K, 53-page Ansi Cobol compile could be reduced to 48 pages.
- A 14K, 12-page RPG II compile could be reduced to 7 pages.

The beauty of thls suggestion is that there is no trade-off required to achieve these savings.

Jack O'Connor
Conway, S.C.

Loophole Appears in Law

(Continued from Poge 15)

stratagems, push the cost of the suit above the $100,000 mark.

In the case of Australia, as with most World Trade countries, the cost would almost inevitably be above such a figure.

In fact, it would most likely be necessary to send lawyers from Australia to Tarrytown, where Pfeiffer's headquarters are, for instance, to find out what the corporation knew about potentially concealed defects. Even after visiting Tarrytown, the lawyers might well have to cover much more ground to track down IBM's knowledge. As a result, the damages ceiling would soon be reached in costs even before the trial started.

Furthar Victimization

So, a $100,000 ceiling would simply invite the further victimization of a complaining customer — which is what the Parliament clearly wanted to avoid happening in that country when it outlawed the enforcement of such limitations.

In fact, it seems likely that the victim's costs could reach a $10 million ceiling. Pfeiffer has given no indication that he would accept a $10 million ceiling, even though it would not be "open-ended liability."

Nor is the matter restricted to Australia. IBM tells me that when open-ended liability was being considered elsewhere, the firm took similar action. Where and how often I don't know, but it appears to be the general World Trade policy not to trade where it can be held fully responsible for damages it causes.

Hopefully World Trade will divulge its rationale for wanting to deny victims of admittedly wrong behavior their right to fully recover any losses. Such an explanation would fill a large void in the public understanding of the IBM vs. Australian Trade Practices issue.

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For further information coll John Storm

Hewlett-Packard

Computer Advances

Vol. 2 No. 3 September 1977

HP 2648 - a bright idea in graphics terminals

The controllers

The HP 2026 keeps the data flowing

A bright idea for a graphics display

The world of graphics is expanding to serve more and more people. High-performance graphics, previously found only with more expensive systems, are now available on the new HP 2648 which has microprocessor control and uses raster scan technology.

The advantages of refreshed raster scan technology are a continually bright display and selective erase— the ability to make changes without having to redraw the entire image. Raster scan graphics require a bit of memory for each displayable point. Low-cost, high-density semiconductor memory now makes this technology economical.

Ready to plot

The HP 2648 is usable the minute you turn it on. The terminal was designed to be system and software independent, to solve real world problems right away without additional investment in software. All the graphics capabilities are hardware and firmware implemented and executable as simple keystroke functions. Off-line, the HP 2648 can record locally-generated drawing commands on optional tape cartridges, play them back, and support graphics program development. With a CPU complement, the user can interactively create more sophisticated graphics.

◀ *Cover*
The design on the screen of the HP 2648 was zoomed to a 10 times magnification. The pattern used emerged from that enlargement.

Auto plot

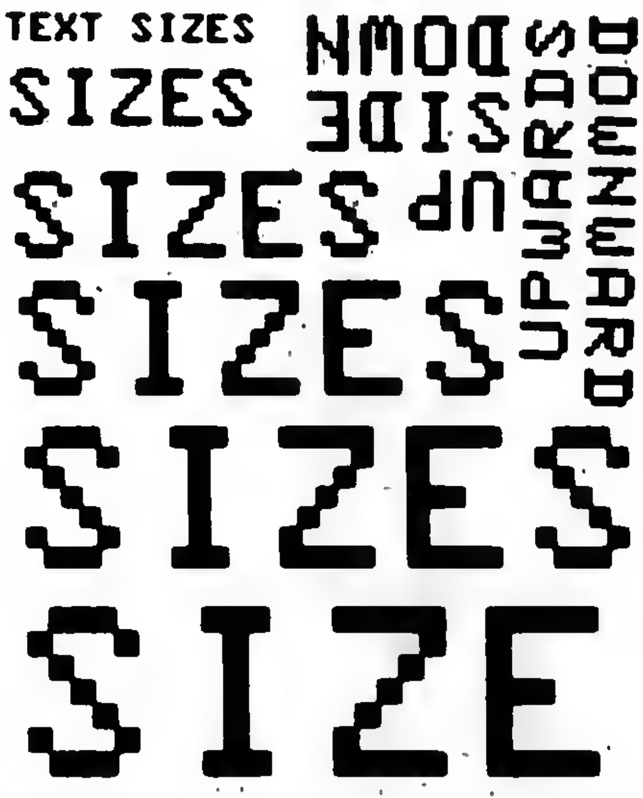
User-generated tabular data can be automatically plotted with X & Y axes. The data can originate from a computer program, from the mini-cartridge, or from the CRT screen. A simple set of questions, in the form of a "menu," is displayed for the user. After first answering these questions — thus defining the data parameters — the user starts the plotting with a single keystroke. Within seconds, and independent of any system or software, the data is plotted. Sophisticated graphic representation of data is now available to more people in business, education, science, and management.

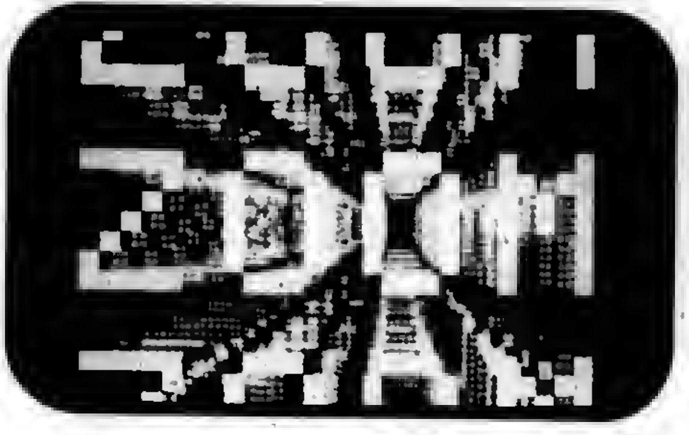
Try it first

There are times when you want to change your drawing without disturbing the data points stored in the CPU's memory. The rubber band line offers a snappy solution to such trial sketches. Line drawings, such as architectural floor plans, can be made and modified quickly. They can even be recorded off-line on the optional mini-cartridge tapes for later batch transmission.

Choices galore

As a user of an HP 2648, you can choose characters of varying shape, size, and orientation, and can right/left justify.



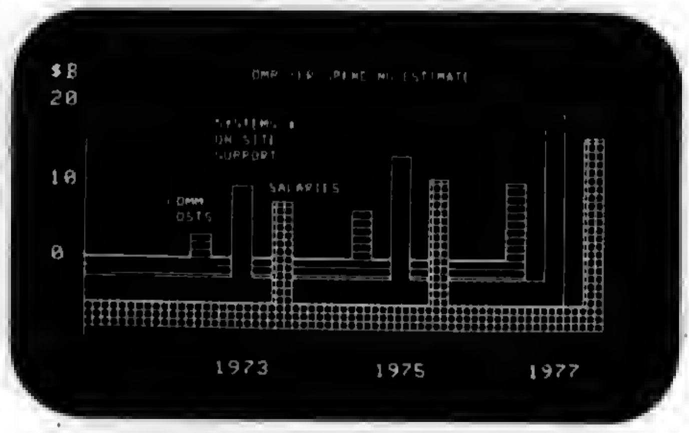


Zoom and pan

Select an area of your display; move right in and magnify it. Zoom one step at a time, or with the touch of a key, zoom automatically to sixteen times the size. Then, pan in any direction through this enlarged display for closer investigation of complex designs. You do not need to reinitialize the data, since the graphics memory has not been disturbed. As zoom and pan are under microprocessor control, they are system and software independent. Without any special software packages or user programming, you can zoom and pan on or off-line.

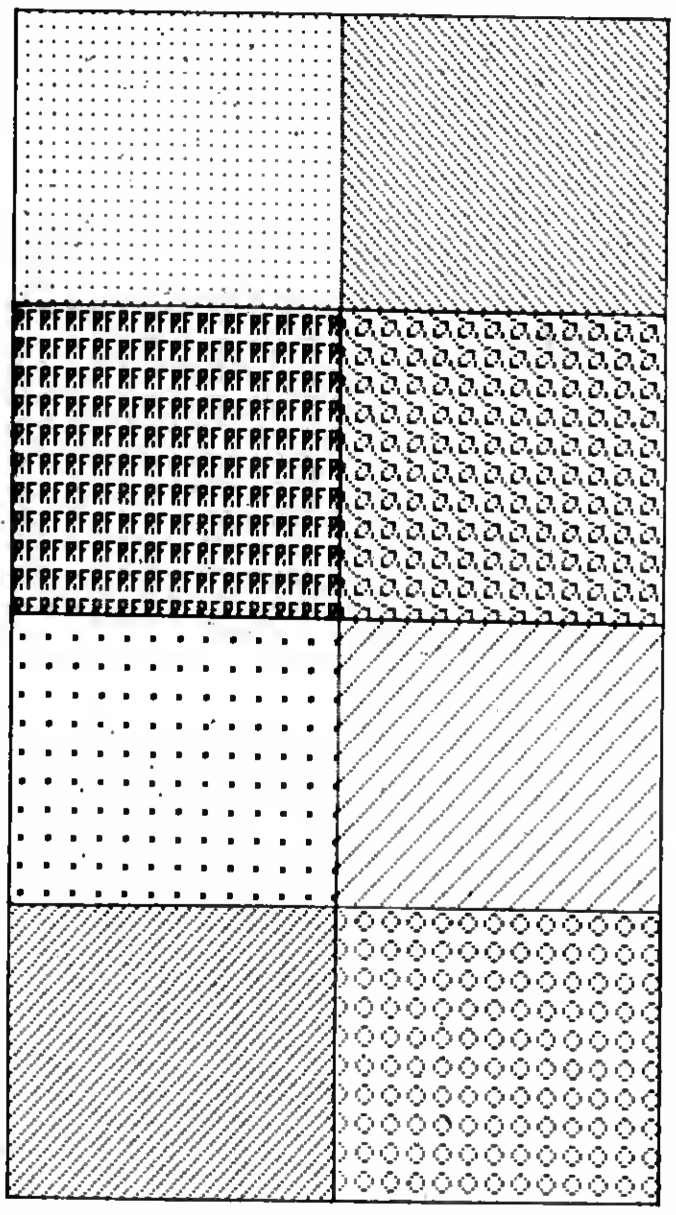
Now you see it, now you don't

The independent alphanumeric and graphics displays each have their own separate random access memory (RAM). So you can view the displays independently or both at the same time. Either memory can be suppressed without disturbing the other. Interact with the CPU/program in one memory and view the resultant picture in the other. This feature makes the HP 2648 perfect both for program development and trial-and-error graphics generation.



Shade your drawings

Rectangular area shading helps distinguish similar shapes. The user can specify different portions of the drawing to be shaded with any of eight available patterns or with his or her own design.



Two terminals in one

The HP 2648 is a dual-capability terminal. Not only can it do sophisticated graphics; it also has those characteristics of HP's 2645 data entry and communications terminal that make programming so easy. These include flexible communications protocols, eight user-programmable keys, full editing, block or character transmission, and off-line data preparation with the dual mini-cartridges. This graphics and alphanumeric combination results in an especially versatile tool.

In the U.S., the HP 2648 costs $5500; when equipped with cartridge tape drives, the price is $7100. Quantity discounts are available.

It is difficult to describe on paper what happens on the display of an HP 2648. **Check A on the reply card for a live demonstration or for more information.**

There's more than one way to weigh a mouse

There's more than one way to weigh a mouse because there's more than one Hewlett-Packard controller that can automate and control processes such as the weighing of medical research animals. Mettler Instrument Corporation of Princeton, N.J., for example, selected HP 9815 desk-top controllers for electronic balance systems that quickly weigh animals that don't want to be weighed. Hazeltine Corporation, of Green Lawn, N.J., on the other hand, plans to weigh fidgety animals using HP 2649 terminal/controllers. One of these products may be the way to solve your controller needs

Terminal controllers

Hewlett-Packard's 2649 is a versatile, microprocessor-based terminal/controller for which technically-oriented users can design their own firmware or hardware. With the help of a Technical Information Package, custom designing application firmware is a three-step process.

Application programs are first assembled on any system capable of producing 8080 object code, such as an HP 1000. Object code is transferred from the program development system to mini-cartridges using an HP 13290 development terminal.

The second step is to test and debug the application firmware by loading and executing these mini-cartridges into the RAM of the development terminal.

Then, application firmware object code is transferred to programmable-read-only-memory (PROM) chips for installation in multiple HP 2649 terminal/controllers. For high-volume applications, read-only-memory (ROM) chips are available from specified vendors.

There are two ways a designer can interface the HP 2649 to external devices. With HP's standard interface cards that provide for serial or parallel data transfer, the user need only fabricate a cable to complete the interface. If the application requires a nonstandard interface, users can design and build interface cards that plug into the back plane. The HP 2649 has eleven optional hardware slots available for I/O, display enhancements, or memory.

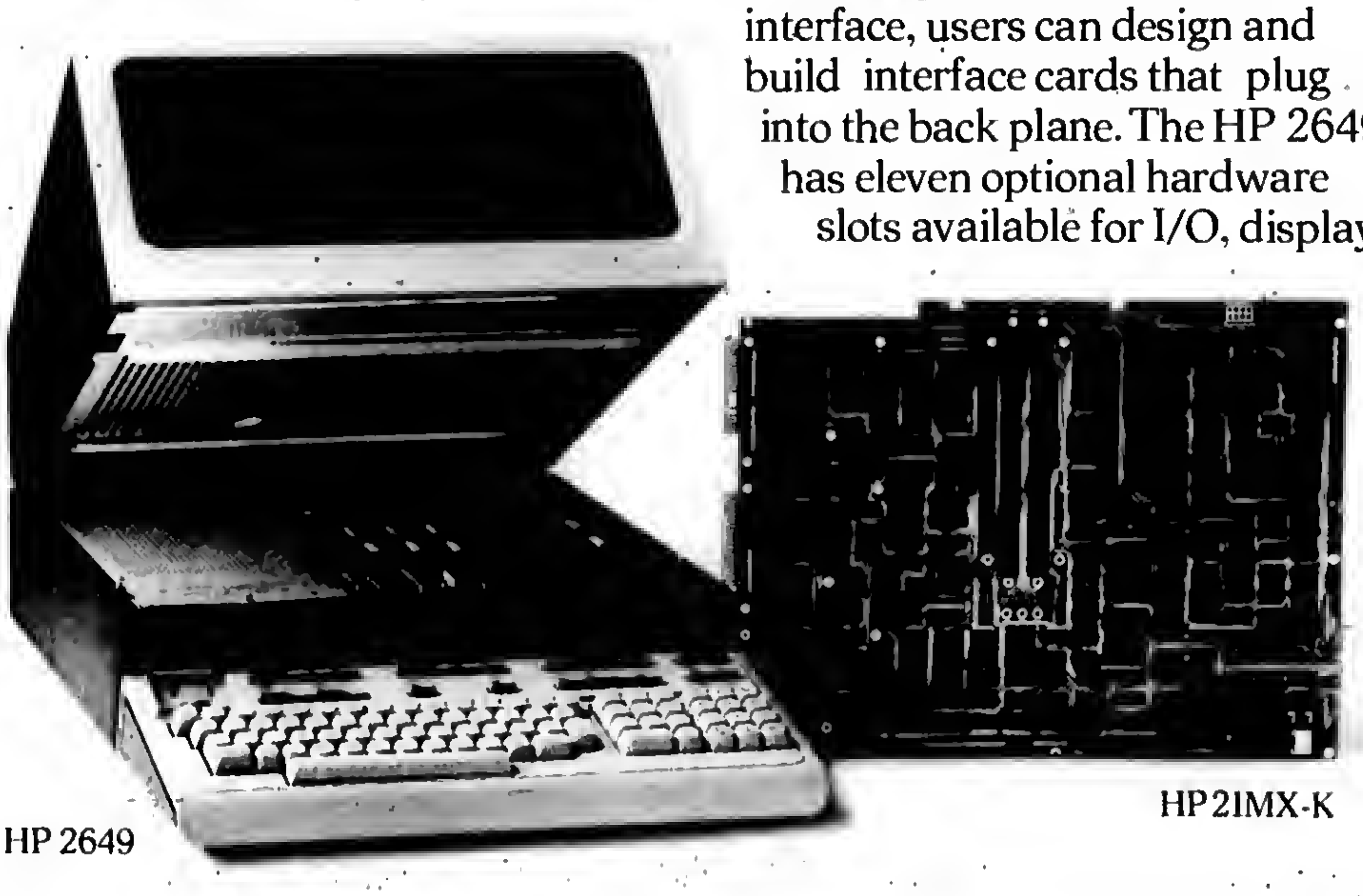
Inherent networking capability of the HP 2649 makes it an ideal tool for interfacing specialized devices to various mainframes. Devices controlled by the HP 2649 vary widely. Among them are laboratory scales, cash registers, typesetting equipment, and analog sensors.

Because of the software and hardware development needed to customize an HP 2649, it is most economical when a quantity of systems are needed for dedicated applications. In a business or industrial environment, where untrained people are using the terminal, the customized HP 2649, with its display screen and modifiable keyboard, becomes an especially friendly interface. The HP 2649 costs $2150.*

Buy a board, build a system

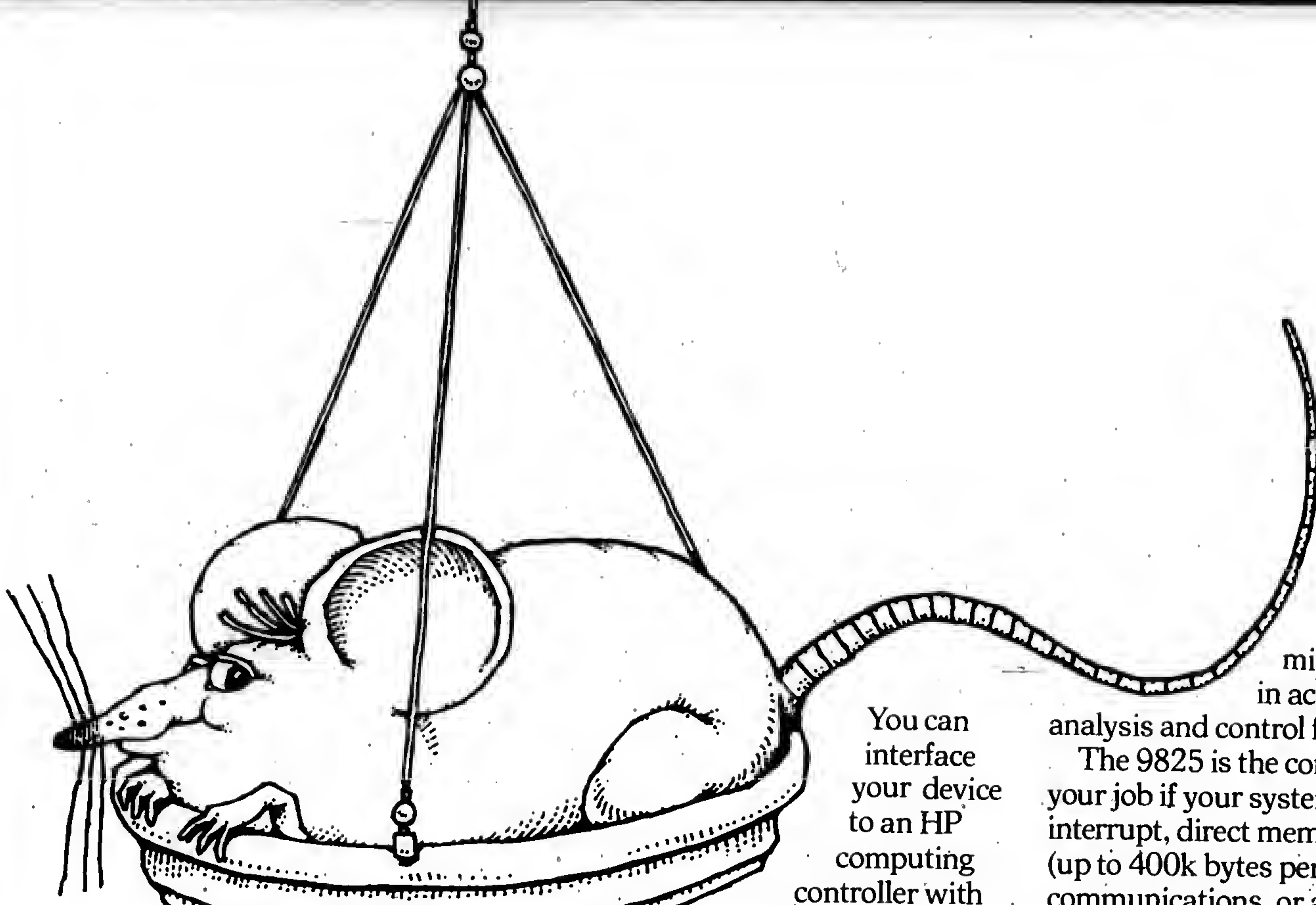
For the OEM designer who needs the power and flexibility of a microprogrammable minicomputer, HP offers the K-series processor, a component version of the 21MX computer family.

Designed to fill the need for high-power processing in a low-cost form that integrates easily into OEM systems, K-Series components offer flexibility in configuring inexpensive products with the full power of a minicomputer. The K-Series can be a full minicomputer that is hardware and software compatible with HP's entire 21MX line. Or, systems engineers can gain direct access to an extraordinarily fast control processor with 325 nano-second cycle time and 210 powerful microinstructions.



HP 2649

HP 21MX-K



Among the many systems applications which can use the speed and power of K-Series components are spectrophotometers, numerical control units, smart data-entry terminals, word processing equipment, graphic display systems, medical diagnostic systems, and many kinds of test equipment. Because the K-Series uses the same I/O scheme as the 21MX family, a wide selection of subsystems is available. These include interface cards for data communications, measurement and control, HP-IB**, and all of HP's broad range of computer peripherals. Prices for the processor board (OEM quantity 100) are $975.*

Just plug them in and program

HP computing controllers, the 9815 and 9825, make system automation easy and direct. Unlike microprocessors and minicomputers, these controllers are integrated in a small, self-contained package that includes printer, tape storage, display, and keyboard. And, you get an operating system and high-level language (pre-programmed in ROM) so you do not need to learn machine language.

You can interface your device to an HP computing controller with a minimum of development time. The physical connection is an off-the-shelf interfacing card with a pre-programmed I/O driver in its read-only memory. You choose from four different interface options — BCD, bit parallel, bit serial (RS-232-C), or HP-IB**. Just insert the card into the controller, and connect the cable to your product. The controller is ready to be programmed for your application using a powerful but simple-to-learn, high-level programming language. HP 9825's HPL provides the ease of BASIC with much of the power of FORTRAN. The HP 9815 uses reverse polish notation, RPN.

Computing controllers manage your instruments, gather data, and process the data to present it in an understandable form. For selected medical and analytical instrumentation applications, and for many measuring systems, HP's computing controllers deliver performance paralleling that of many minicomputers in acquisition analysis and control functions.

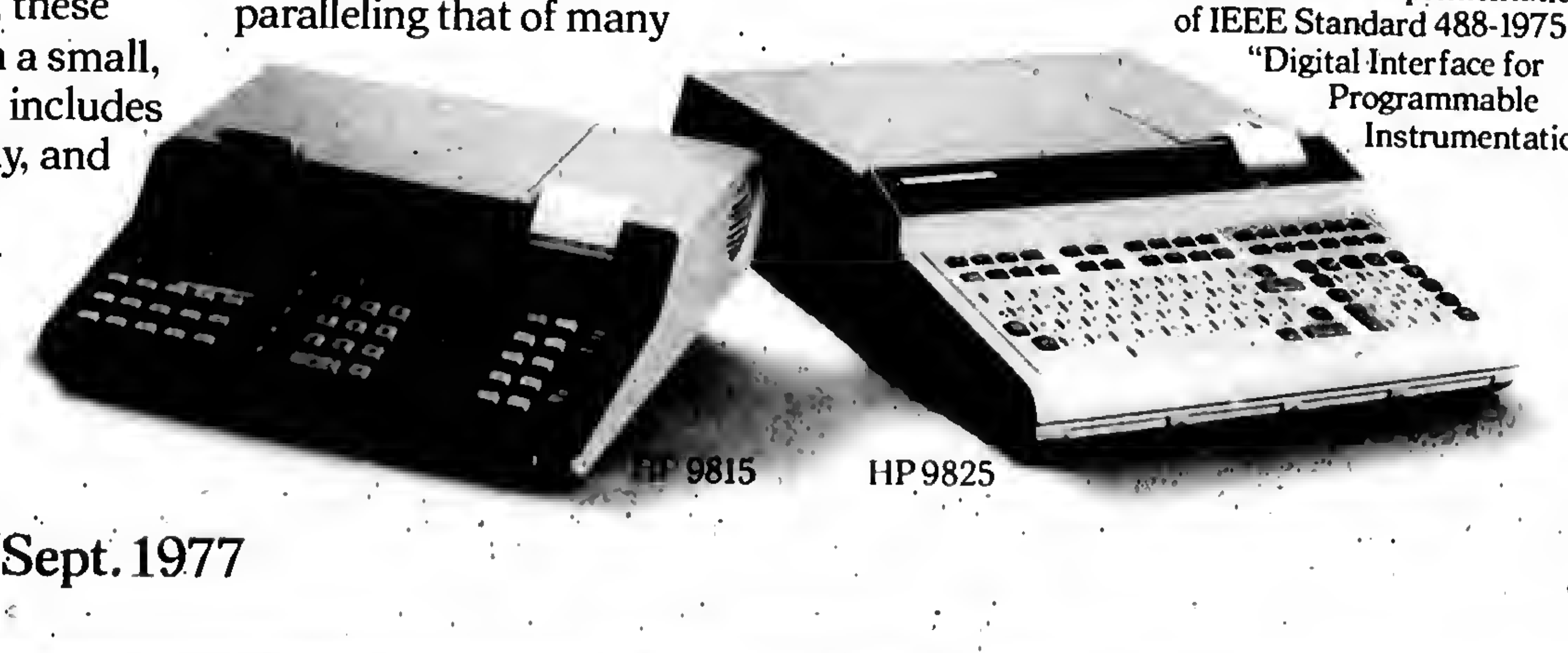
The 9825 is the controller for your job if your system requires interrupt, direct memory access (up to 400k bytes per second), data communications, or automatic data entry at random times; or if you will be working with data bases of more than 100,000 bytes. If these capabilities are not essential, consider the HP 9815. It is the perfect cost effective controller for systems of one or two input or output devices.

The HP 9825 is the first small desk-top computer with interrupt capability. Interrupt gives the controller flexibility to respond to several independent devices that require service at unpredictable times. "Live keyboard" capability enables you to interrupt the 9825's processing to calculate or to interrogate — for example, to monitor a program, or to alter a variable while a program is running.

The HP 9815 is available for $3100*; the HP 9825 for $5900.* **For more information on HP's controllers, the 2649, 21MX-K, 9815, and 9825 indicate B, C, D, and E respectively on the reply card.**

*U.S. domestic prices only.

**HP-IB is Hewlett-Packard's implementation of IEEE Standard 488-1975, "Digital Interface for Programmable Instrumentation."



The HP 2026–and how it keeps the data flowing at Hewlett-Packard

Hewlett-Packard's 2026 data entry and communications system takes a dramatic step beyond traditional data entry. Besides source data entry, it also supports local data storage and retrieval, data communications, and remote job entry —all in a single proven package that costs $38,500.*

The terminal-intensive HP 2026 system is suited to large companies with geographically-dispersed locations. It satisfies their need to enter, store, and retrieve data locally, yet process it elsewhere.

Source data entry

The powerful Data Entry Application Language (DEAL) makes the development of data entry applications quick and easy. With development of screen formats at a central location, DEAL ensures that the same set of screen formats and edit specifications are used throughout the HP 2026-based network. Source data entry, then, is complete, accurate, and consistent.

Local storage and retrieval

File management capability gives users the ability to quickly scan and retrieve information locally. It eliminates the need to enter repetitive data, and allows sophisticated source data editing.

Point-to-point communications

Any HP 2026 system can act as a central data collection point within the network or transmit information directly to any other HP 2026. Use of innovative software technology results in significant reduction of data communications costs.

Remote job entry

An RJE capability allows any HP 2026 system to communicate directly with large computers, such as HP 3000's or IBM 370's.

The basic HP 2026 system consists of an HP 21MX E-Series processor and disc drive in a desk-style cabinet, and an HP 2645A console terminal. Each HP 2026 can support a total of sixteen additional page-mode multidrop, 9600 baud 2645A CRT terminals. If your applications require more than just data entry and retrieval, and you need sophisticated data management, data processing, or program development using traditional programming languages, Hewlett-Packard offers the multi-purpose HP 3000 computer system.

The HP 2026 was originally developed to meet Hewlett-Packard's needs. Today, after six years of intensive use, it affects virtually everyone at HP...

"Over 10 million words funnel through my data center every single day"

Bill Taylor, HP 2026 manager at HP headquarters, comments; "It's a flexible, all-purpose network that transmits any digital information. Our central system receives data several times a day from other 2026 locations around the world.

"Sixty percent of the data is marketing-related," Bill states, "such as customer orders and acknowledgements. Fifteen percent is accounting data, 10% is employee personnel/payroll data, another 10% is general message traffic, and 5% special files.

"An RJE capability also allows HP 2026 sites to directly communicate with larger host computers. Communication is possible via

---

*U.S. domestic price (currently available in North America and Europe only)

2780 emulation and multileaving HASP workstation protocols. All data communications and RJE programs can be executed concurrently with data entry."

"With just 20¢ and four hours I can send a message to any HP office in the world"

"It wasn't that way six years ago; our commercial TWX service costs were skyrocketing," reflects Bob Boniface, Hewlett-Packard's executive vice president of administration. "Now, with the 2026 network, 117 systems at any of 94 network sites can communicate with each other. And...the costs are descending, not spiraling upward."

"If I ever again had to enter orders the way we used to, I'd quit"

"I transmit over 3700 sales and service orders monthly," begins Carol Larsen, HP order entry clerk. "As I input an order, the HP 2026's CRT terminal prompts me through all the screens I need. And, it blinks to alert me if I make a mistake. Most errors are corrected at the terminal, so only valid data is transmitted to the system.

"We received the system 1:30 one afternoon," Carol relates, "and, by the time I went home, I felt comfortable using it. I didn't even pick up a user's manual—the terminal taught me with a 'how to' tape cartridge.

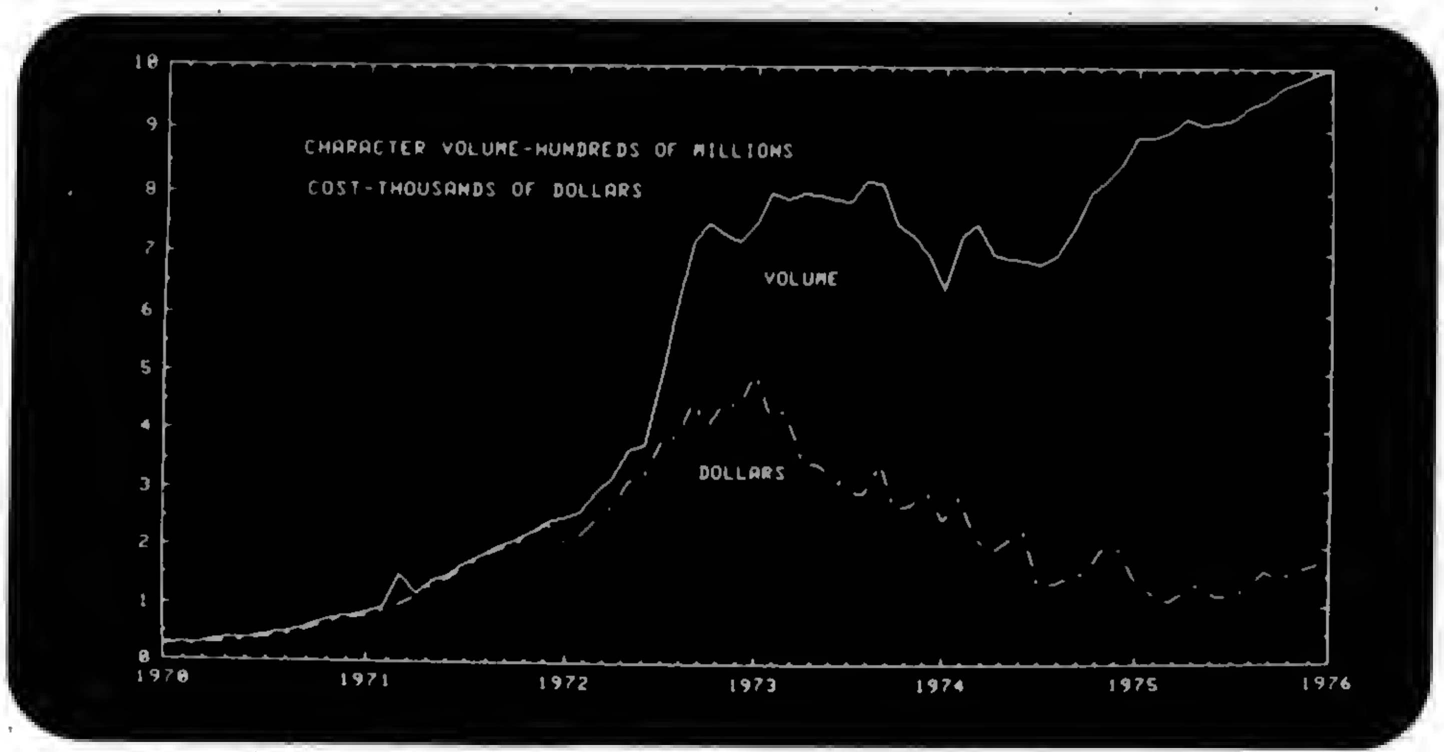
"Besides entering new orders, I can store and retrieve order status here, where we need it, to assure quick response to customer inquiries. If a customer calls me about an order, I simply key in that order name and number, and provide a timely status report over the phone.

"Plus, I don't have to type repetitive data. Our sales office assigns a number to each customer. By entering that number alone, I can retrieve and automatically include customer name, address, phone number, shipping destination, and other pertinent information—all stored on local files."

"We paid off all our capital equipment costs in nine months"

"The HP 2026 gave us a significant, easily-measured return-on-investment," says Hank Taylor, HP corporate marketing services manager.

The HP 2026 (cont.)



In the last four years, the domestic volume of data transmitted by the HP 2026 has more than doubled. But, during that same time, costs have decreased by 60%.

This graph was generated by "auto plot" on the new HP 2648 graphics terminal. (See page 3)

"Comparing data communications costs before and after installing the system revealed that, in less than a year, our line charge savings paid for the system.

"I also recall another significant measure. HP's data entry error rate decreased by 60% using HP 2026 system CRT's rather than former methods. This reduction in errors is also a result of the use of the HP 2026 Data Entry Application Language (DEAL). This powerful software simplifies and shortens the source data entry program development process.

"You see, our central data processing staff develops all data entry screens so that consistent formats and edits can be transmitted to each HP 2026 site. In this way, we maintain central control and ensure that everyone in the network is using the same set of data entry screens. All the development is done by one central data processing staff. Remote sites, of course, still have the capability through DEAL to quickly tailor our screen formats without data processing experts."

"HP'S 2026 is one of the most efficient point-to-point communication systems available"

"We use voice grade common carrier facilities and two HP 2026 data transmission innovations which make the system unusually efficient," explains Terry Eastham, lab engineer.

"A data compression/expansion technique used between HP 2026's typically compresses our data to 50% of its original volume," continues Terry. "Blanks, numeric strings, alpha strings, and redundant data are compressed and expanded by this feature. In addition, we use a reverse channel line protocol which can yield up to another 40% throughput improvement over normal bisynchronous techniques.

"The combination results in reduced data transmission time and, therefore, significant line cost savings."

For further information on the HP 2026 and HP 3000, check F on your reply card.

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C. 21MX K-Series Components	☐	☐
D. 9815, 9825 Controllers	☐	☐
E. 2026 Data Entry and Communications System	☐	☐

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E. 2026 Data Entry and Communications System	☐	☐

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Letters to the Editor

A Hearty Endorsement

I heartily endorse the sentiment expressed in the editorial of Aug. 29 entitled "First Things First." The continued development of the information sector is dependent upon public confidence that basic rights, such as the right to privacy, will be protected.

Problems arise when these rights collide with competing values such as freedom of information, criminal justice requirements, welfare reform, economic activity and oversight of government. Experience has shown that privacy protection must accommodate such values whenever possible; otherwise, it is privacy protection which is too often forced to give way.

National information policy should reflect the need for such accommodation by providing a focal point for choosing between competing values. In this way, it would neither threaten nor ignore individual rights but would instead be a major element in their preservation. Computer*world* has reminded those who will be shaping that policy of its importance.

Quincy Rodgers
Washington, D.C.

Rodgers is former director of the White House Committee on the Right of Privacy and project director of the "Report to the President on National Information Policy." Ed.

Advice for Mini Users

In the Aug. 29 issue, the report on a survey of over 200 mini users generally showed the minis were rated very highly, but there were some adverse comments on software.

As a user, I have found that if the jobs are small but complex, it is best to train the users to write their own limited software programs. If the jobs are complex with large amounts of number crunching, the best method is to use professional programmers. In either case, it is vital that users understand both software and hardware if they are to get good results.

With minis, the user comes closer to hardware and software, and with micros, hardware and software will often be on users' desks.

Under these circumstances, users of the future will prepare more of their own programs, Professional programmers will have to be more intelligent, sensitive, imaginative and even intuitive to meet the users on common ground. Programmers will have to understand users and the users might even have to understand the programmers.

James G. Ryan
Lexington, Mass.

Three Points to Make

The Aug. 29 issue contained three items of particular interest to me. The first is very important.

Robert Bigelow's letter in reference to Frederick Withington's testimony brings up a critical point. While a court might force a physician to reveal facts, I do not think it could force him to practice medicine, i.e., diagnose or treat a patient. In the same way, I feel the Arthur D. Little position is correct.

Second, Jack Stone's article on automated physicians is about as appropriate as some early thoughts about piloting planes. While coordinating the computer programming of all vendors on the Sage air defense system in the late 50's, I knew there were those who thought we could eliminate pilots. We still use pilots, accountants and part clerks. My organization uses computers to facilitate the work of physicians, but I'm sure the MDs will be around as long as the pilots, bookkeepers and the two men in the petroleum cracking plants.

And finally, Joe Rigo is very sharp after 13 years of experience in the field. When I had 13 years' experience, Roger Hallock of TAC taught me about whole new areas of pre-entry data organization. A few years back (17 years' experience) I discovered I knew nothing about data bases. Anything, even the Certificate in Data Processing, that broadens a practitioner's comprehension of the field is valuable.

Hugh Cort
Medical Center
University of Alabama
Birmingham, Ala.

Disturbed by 'Controls'

The article "Controls Urged on Technology" [CW, Aug. 15] disturbed me considerably. How a man (Josef Kates) from a free country can suggest "national controls on technological innovation" reaches far beyond my logical reasoning process. Surely he meant "guidelines" or "prevention of misuse" but not all-out government controls.

In the editorial "A Comforting Thought," in the same issue, an unnamed "Western Cybernetics expert" states "Americans have dealings linked with a computer at least 10 times a day." If that were even close to the truth, Mr. Kates' wishes, if ever realized, could have a profound effect on our lives.

"Technological sovereignty as a prescription for Canada's difficulties" is like a doctor prescribing cyanide to combat a cold. It eliminates the cold but kills the patient.

Wes Williams
Downey, Calif.

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld.*

In the ten years since Data Base Management Systems were introduced they've grown to a multimillion dollar subindustry in their own right. As late as 1973, less than 1,000 DBMS were installed; but International Data Corp. estimates that over 5,000 are in use today, and this number will increase to 8,200 in the next two years. This phenomenal growth has been fueled by the hoped-for benefits of DBMS, which include increased programmer efficiency, the elimination of redundant information in the data file, and greater ease in coping with system upgrades and reprogramming.

But a data base management system should be evaluated carefully before you commit to purchase. They have developed such a reputation as problem solvers that people tend to expect more from them than they can achieve, while overlooking or minimizing the effort required.

We'll have several experts on hand to help you arrive at a realistic understanding of DBMS in our October 31st special report edited by Don Leavitt. Here is a sampling of the kinds of articles you'll see:

- Combatting the "Holy Grail" syndrome — Being realistic about the benefits that are possible in relation to the effort required; how to assess whether DBMS will enable you to reach your goals.
- How well are installed systems living up to expectations? A review of typical problems that need to be overcome.
- The role of the Data Base Administrator in DBMS — including considerations like the physical arrangement of the data base.
- How dictionary packages, report writers, etc. interface with DBMS software.
- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Letters to the Editor

Poorly Developed Theory

The Aug. 22 column by Jack Stone, "Where Are the Operations Success Stories," contained a thesis I found poorly developed and unsubstantiated. Stone may have a wide circle of contacts but his implied conclusion that there are few successful operations is presumptuous and naive.

We all come to conclusions about our own experience and environment from time to time, but we cannot validly extend our conclusions universally without some kind of analysis, survey or substantiation.

I know of successful operations and of some rather less than successful. Condemning them all in a column of a widely read publication is old hat, passe, unrealistic and no longer interesting. I thought our profession was growing out of that tired approach.

Perhaps Stone was "baiting" readers. A simple request published in the column would have been more appropriate and perhaps more fruitful.

Jean A. Fowler
Raritan, N.J.

Umpires in the DP Game

In the Aug. 22nd issue, Jack Stone, in his search for a successful data processing manager (DPM), brought to light a tragedy caused by organizational hierarchy.

This company hierarchy includes everyone from the president to the lowest clerk. DPMs are somewhere in the middle, with roles similar to those of umpires in a baseball game. They must call the pitches (reports) but they have no control over the game (management).

Under these circumstances, DPMs must consider themselves successful when they do their job well, and then accept the boos as all good umpires do. It's a tough job!

Happy DPMs are those who are lucky enough to be either aware of or involved in the total operation of an enterprise. It was no coincidence that his one successful case was actually involved in a scientific problem.

James G. Ryan
Lexington, Mass.

Root of Antitrust Delays

I have just recently read the article in the May 9 issue entitled, "U.S. vs. IBM Shows Shambles of Antitrust Law, Senate Told." That article characterized my May 4 testimony before the Senate Subcommittee on Antitrust and Monopoly to the effect that "He, too, put the responsibility for defining the direction of these suits at the doors of the judges who hear them."

The title of your article, the above quote and your use of my statement to the subcommittee that I have "no defense" for the longevity of the IBM case make it appear that I singled out one government case for criticism, above other major government antitrust cases.

The article does not reflect my remarks in context, nor my views. I certainly did not criticize the competence or performance of any judge; my point was aimed at a larger, generic issue.

The thrust of my testimony concerned the government's failure to properly investigate and then to manageably define the issues *prior* to bringing massive antitrust cases. This lack of issue definition by the government, in cases of major economic (and social) consequence, places severe burdens on the judicial system when it attempts, under the liberal federal discovery rules, to manage pretrial discovery. This, in my view, is a principal cause of complexity and delay in "big" antitrust cases.

The problems of administering complex antitrust cases are generic and require across-the-board evaluation and solutions. Simplistic solutions suggested by others — such as an "elitist" group of roving antitrust judges — read better than they will play, and they miss the mark.

The essential problem is to find the means to quickly define the issues in these major cases and, without depriving the parties of due process, make discovery and trial manageable.

Ira M. Millstein
New York, N.Y.

CRTs Can Be 'Congested'

I was interested in the article "Caution: CRTs May Be Eye Hazard" [CW, July 18]. I must disagree with Jeryl Sparks, who stated that the dot matrix print is "horrible." I have never seen any research that indicates a dot pattern is more difficult to read than individual lines forming the same character.

It seems to me the main reason for CRT terminal eyestrain is too much information on the screen. Operators must move their eyes continuously, putting strain on the eye muscles. Publications such as Computer*world* recognize this problem and make their columns narrow. As a result, the eye can scan an entire line without having to move in a horizontal direction with resultant muscle strain.

I believe the problem is not having to focus on dots (although close work will cause eye strain), but simply that the eye has to move to read an 80-column wide line.

Byron Cole
President
Informer, Inc.
Los Angeles, Calif.

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I/O System Included

'TMS' Builds, Updates, Accesses Tables

By Don Leavitt

CW Staff

MILL VALLEY, Calif. — The Table Management System (TMS) from Jeffrey L. Walker & Co. was designed as a standardized, efficient means of storing and retrieving table information in an IBM 360/370 environment, according to a spokesman.

A table, in this context, is a group of arguments and results. An argument — essentially a record key — is known at table access time while the result — desired record data — is returned to the user by a successful table lookup operation, the spokesman explained.

TMS supports the creation and maintenance of tables used in systems and programs without requiring program changes, recompiles or relinks, he said. Using the software, tables can be created for one others.

Internally, the tables are retained on a random file and do not require reorganization even after changes of contents. A standard backup and restore capability is provided as part of the TMS package, the spokesman noted.

Each table can contain any number of entries; access to the table file from a user's application program is handled through the use of the package's search subroutine. It interfaces with the Input/Output System (Iosys) a file organization method used by TMS to perform all table I/O processing [CW, April 11].

Two user-oriented programs are part of the package. Tabsys is a batch program for table file maintenance; Tabl does equivalent work, on-line.

A series of available, separate-cost features can extend the basic package to include data compression and data protection support and interfaces to either the IBM CICS or the GBA International Swift teleprocessing monitors.

The basic package, described as device- and operating system-independent, requires 48K for the file maintenance subsystem.

The package costs $5,000 or $500/mo for a year; the options are typically an additional $1,000 each, the company noted from 655 Redwood Highway, Mill Valley, Calif. 94941.

For DG's RDOS Users

'Wordmap' Prints Cross-References

PALO ALTO, Calif. — A debugging and documentation tool, Wordmap from Information Processing Techniques Corp. (IPTC) was described by the vendor as a general-purpose, symbolic cross-reference generator for Data General Corp. minicomputers.

Given text files for input, Wordmap produces a listing of the files with line numbers and then generates an alphabetically sorted table of all symbols in the files, a spokesman said..

Along with each symbol in the table is a list of line numbers indicating where every reference to the symbol can be found, he said.

The package accepts "any form" of text including Fortran, Algol or Assembly language programs and English or other narrative documentation. Input files can be of any size and contain symbols of arbitrary length.

Wordmap suppresses any number of user-specified symbols such as Assembler op codes or compiler keywords, he said, and this results in a cross-reference table tailored to the user's requirements. The suppression facility allows Wordmap to be used for file comparison and spelling corrections, he added.

Global in Nature

The cross-reference listing produced by the package is global in nature: it can encompass a complete source file containing many subprograms, the spokesman said. Facilities provided with many compilers are limited to cross-referencing each program separately, he noted.

Output from this package includes page headers giving the date, time, file number and page number; output can be written to any file or device. No internal sorting methods are used, so Wordmap is not limited by memory, the vendor said.

The package functions on a minimum DG Nova needed for RDOS operations, as well as on larger Novas and Eclipses using that environment.

Wordmap is available on magnetic tape in RDOS-executable form for $950, IPTC said from 2462 Embarcadero Way, Palo Alto, Calif. 94303.

'Ramis' Gains Interface With IMS

PRINCETON, N.J. — An interface that provides users of the Ramis II and Ramis DOS information processing systems with fully automatic access to data bases under IBM's IMS and DL/1 has been announced by the Ramis vendor, Mathematica Products Group, Inc.

With the linkage, the Ramis nonprocedural language is used to issue the request while the standard Ramis report capability formats and displays the report, the vendor said.

Once the IMS data base is described to the system's internal dictionary, Ramis appears to process an IMS data base as though it were any other file.

The interface is efficient, Mathematica explained, because the appropriate sequence of DL/1 calls is issued by Ramis to retrieve the proper IMS segments; Ramis screening conditions, mapped into DL/1 logic, are used to provide qualified segment search arguments.

Batch Program

The interface operates as a batch program — in IMS terminology. It may be activated under IBM's TSO, effectively providing time-sharing access to off-line IMS data bases through the Ramis language, the spokeswoman continued.

The Ramis-IMS interface operates through a special module within the Reporting from External Files (REF) Ramis option. The module is currently available for $4,000 or $140/mo for 36 months.

The REF option can be purchased for $5,500. The basic Ramis II software needed to utilize the IMS interface costs $34,000 while the Ramis DOS packaging starts at $20,000.

Mathematica Products Group is at 14 Washington Road and can be reached through P.O. Box 2392, Princeton, N.J. 08540.

Directory Lists T/S Services

PHILADELPHIA — The looseleaf "Remotely Accessible Conversational Programs and Data Bases" directory contains descriptions of individual facilities offered by time-sharing vendors.

The $28 annual subscription includes bimonthly updates, according to the publisher, Gregory Research Associates, 1900 Greymount St., Philadelphia, Pa. 19116.

Siemens CPUs Get 'Easytrieve'

OAKBROOK, Ill. — Easytrieve, the information retrieval and data management system from Pansophic Systems, Inc., has been made compatible with Siemens 4000 series CPUs running under BS1000 or BS2000 environments.

The system was previously available only for IBM 360/370 hardware, a spokesman noted.

The Siemens hardware population is centered in Germany and Scandinavia; pilot versions of the Easytrieve package have been installed in both areas, Pansophic said from 709 Enterprise Drive, Oakbrook, Ill. 60521.

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'CPS' Gives Mathematical Program Support

HOUSTON — Management scientists, operations researchers and others with mathematical programming requirements may get the help they need, regardless of what large-scale CPU they have, with the Key Conversational Planning System (CPS) now available from Lowell-Welter Associates (LWA).

The package incorporates an array of capabilities for interactive or batch operations, including linear programming, nonlinear programming and dynamic programming, an LWA spokesman said. Key CPS runs on Fortran-compatible CPUs, he added.

Users are said to have complete control of logic and solution strategy in both modes of operation. Only two control commands — which can be entered from terminal or console — are needed to make any of 125 million combinations of conditional changes to, for example, a 75x150 representation, the spokesman claimed.

The user may also enter data, examine selected portions of the results, change the data, change the solution strategy and continue the run under new conditions until either additional modifications are indicated or the desired results are achieved, he said.

In a single job stream, several cases may be run as variations of the original base case and results from previous cases can be used to specify a new case and then modify it.

Key CPS is designed to efficiently process 150x300 representations interactively in 78K bytes of memory, the spokesman claimed.

The package costs $11,500 or $400/mo for a minimum of six months. Two days of on-site training and consulting, ordered concurrently with the licensing, costs $1,000 plus travel expenses.

Lowell-Welter Associates can be reached through P.O. Box 1597, Houston, Texas 77001.

PDP-11 Linked to 360/370

IRVINE, Calif. — The Distributed Processor Communications Module (DPCM) from Computer Solutions is used to move data between a Digital Equipment Corp. PDP-11/03 processing station and any other devices that meet binary synchronous communications protocol, including IBM 360/370s.

The addition of DPCM allows a stand-alone PDP-11 to be extended to access the resources of a large-scale CPU to which it has been attached, while retaining features developed for its local operations, a spokesman explained.

The DPCM user need not know teleprocessing "internals" to work with the package. Application programs communicate with DPCM through READ and WRITE calls, much as any peripheral is addressed.

The parameters in the calls are validated by DPCM, which alerts the user if an error is sensed. This early warning system "significantly" reduces check-out time during program development, the spokesman asserted.

The package features data transmission rates up to 9,600 bit/sec and transparency is provided for binary data. Both the Ascii and Ebcdic character sets are supported, including error-checking routines and retransmission for bad blocks.

A trace table may be optionally loaded which aids in the identification of teleprocessing problems. DPCM is time-independent of the user: All timing is controlled internally, according to the spokesman.

DPCM requires a PDP-11/03 with 4K words of memory, a DEC DUV11 parallel synchronous interface and a modem. The software, distributed as a Fortran-callable routine, costs $2,000, Computer Solutions said from Suite L, 17922 Sky Park Circle, Irvine, Calif. 92714.

Impact of ZBB To Be Discussed

WASHINGTON, D.C. — "Zero-Base Budgeting in the Federal Government: A Performance Audit of the First Six Months" will be the topic of a meeting here in late October, sponsored by the Federal ADP Users Group Special Interest Group on Zero-Base Budgeting and Automated Data Processing (SIG/ZBB/ADP).

Logan Cheek, author of *Zero-Base Budgeting Comes of Age*, will be the principal speaker at the session, on Thursday morning, Oct. 20, at the General Services Administration Region 3 Auditorium.

More information is available from Ken Burroughs, Chairman of SIG/ZBB/ADP, c/o U.S. Chamber of Commerce, 1615 H St. N.W., Washington, D.C. 20062.

Energy Systems Listed

SPRINGFIELD, Va. — The $20 "Directory of Software Applications: Energy 1977" contains abstracts of 300 energy-related programs and reports in various computer languages. It is available under catalog #PB-264 200, in paperback or microfiche, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161.

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By contrast, most graphics terminals in the field today (with storage tubes) are about as far from interactive and intelligent as you can get.

Dependent is more like it. Because, typically, every graphic image — and every graphic manipulation — has to be carefully calculated, then transmitted, by the host computer to the waiting graphics terminal.

This whole routine not only puts a tremendous burden on the host computer (which usually has other jobs to do) but routinely requires lots of special software.

With storage tube type terminals, even routine manipulations like panning, zooming, selective erasing and message changing aren't very fast. In fact, the terminal operator is required to wait — up to several minutes — for a previous image to be completely erased and the second image to be tediously redrawn.

You get the picture, all right. But you'll get it faster with the new CalComp IGT-100. Because the IGT-100 is the quickest solution to these traditional problems. And easily, one of the most affordable.

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Coupled with 12K bytes of RAM memory, the IGT-100's microprocessor permits local storage, manipulation and completion of display functions. While providing an addressable memory matrix of 1024 X 680 bit positions. And a viewable matrix of 416 X 312 positions.

A keyboard with a 64 character ASCII set and an asynchronous RS-232-C interface are also supported by the IGT-100's microprocessor. Full or half duplex modes are switch-selectable. Along with asynchronous communication transmission rates from 300 to 9600 baud.

Give your new IGT-100 the whole picture and you'll never redraw it again.

Unlike most other graphics terminals, the new IGT-100 can store and manipulate images on a totally local level.

That means once an image is transmitted, you've got complete, autonomous control. All planning, selective erasing and message changing is instantaneously handled by the IGT-100's built-in microprocessor.

Even write-thru's, grids and zooms (2x, 4x, 6x and 8x) are displayed on the screen within 1/10th of a second.

And all without tying up your host computer. Or waiting several minutes for the image to be redrawn on a storage tube.

In fact, working with its built-in microprocessor, the IGT-100's longer-lasting raster scan screen will beat a conventional storage tube every time. Delivering a faster, brighter image at a flicker-free rate of 60 frames per second.

And that's a mighty pretty picture — any way you look at it.

Structured Maintenance — Part 2

Cost to Reshape User System Can Be Forecast

By Edward Yourdon

Special to CW

I would appreciate some feedback on the concepts of structured maintenance and some ideas on the guidelines needed to give it form as an approach to improved programmer productivity.

In last week's article, I suggested some of the things a programmer has to do to be successful and effective in reading "alien" code.

The other important part about reading programs is knowing what to look for. As many programmers know, most maintenance problems are associated with loops, decisions, logical expressions, subscripting, numerical operations, error-handling, data structures or input/output operations. For each of these areas, a number of specific "what-to-look-for" guidelines can be given.

Some of the other important pieces of structured maintenance are also the result of several years' experience with the structured development of new systems. For example, many of the "pilot projects" that have been used to demonstrate the effectiveness of structured techniques have been *conversions* of old systems to their new structured equivalents.

As a result, we now have a growing body of evidence with which we can estimate several factors:

- How much it costs to reanalyze, redesign and/or recode an existing system.

For example, it usually turns out that such efforts can be carried out at the rate of 20 to 25 debugged statements per day instead of the usual 10 to 15 statements per day. And it is reasonable to estimate, in the absence of any other evidence, that the new structured system will be approximately the same number of statements as the old version.

- How much more reliable the new system will be.

This depends largely on whether the old system has "settled down" or whether it continues to be unstable.

- How much more maintainable the new system will be.

In most cases, it is reasonable to assume that maintainability will improve by at least a factor of two, and possibly by as much as a factor of 10.

- How much more CPU time/memory will be required by the new system.

A reasonable "worst case" estimate is that a new structured system will require no more than 5% to 10% additional hardware resources. In addition, in a surprisingly large number of cases, the new system is considerably more effficent than the old system, since the new designers are, in a sense, able to stand on the shoulders of the original designers and see a better way of approaching the problem.

Readers are invited to comment on "structured maintenance," or any alternate technique they have developed to cope with the maintenance problem, by writing to Yourdon at Yourdon, Inc., 1133 Avenue of the Americas, New York, N.Y. 10017.

Program 'Restructuring'

Another structured maintenance technique involves the "restructuring" of existing programs. This, too, is based on techniques that were originally developed for structured programming. There are a number of techniques that can be applied either manually or mechanically to restructure code (see, for example, Brenda Baker's article in the January 1977 *Journal of the ACM*).

While there is considerable controversy about the merits of mechanically restructuring whole programs and systems (remember when we tried to mechnically convert 1401 Autocoder programs to Cobol?), there is no question that these techniques can be useful as a guideline for rewriting small chunks of existing logic that, in their present unstructured state, are impossible to understand.

All in all, structured maintenance is based largely on common sense and on techniques learned in structured programming and structured design. So why all the fuss about it?

Partly because, as Will Rogers once said, "Common sense isn't common." Remember, structured programming is still dismissed by some skeptics as trivial "common sense" — and yet it's evident that all of us need some rigorous, disciplined guidelines to ensure that we don't forget our common sense in the excitement of coding.

Also, it's evident that the structured design/programming movement has, to a large extent, been ignored by a large group of maintenance programmers. And who can blame them for ignoring discussions about the virtues of *future* systems when they're still responding to midnight phone calls about their *old* systems? So, it's time we developed a package of guidelines and techiques specifically tailored to the needs of such people — and that's what structured maintenance is all about.

Yourdon is chairman of the board of Yourdon, Inc., New York, and author/coauthor of several books on "structured" DP techniques.

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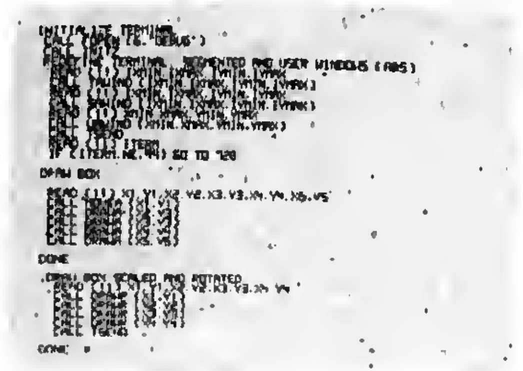
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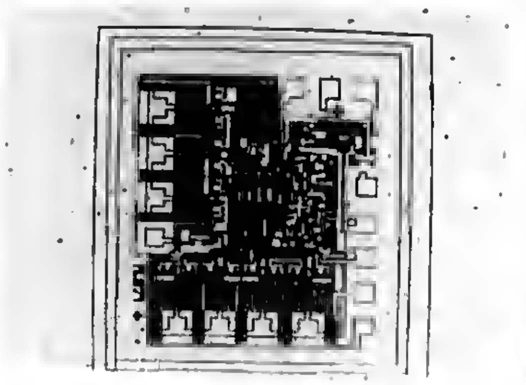
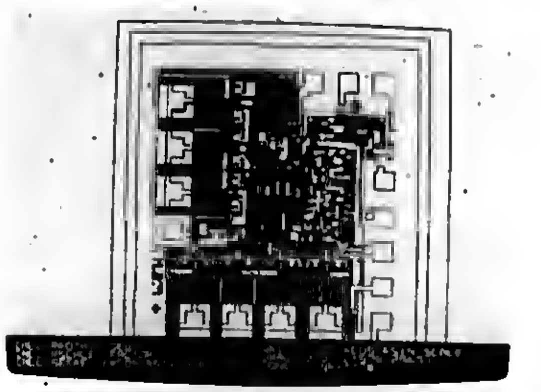
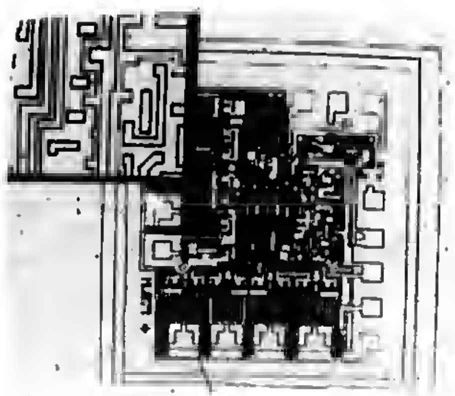
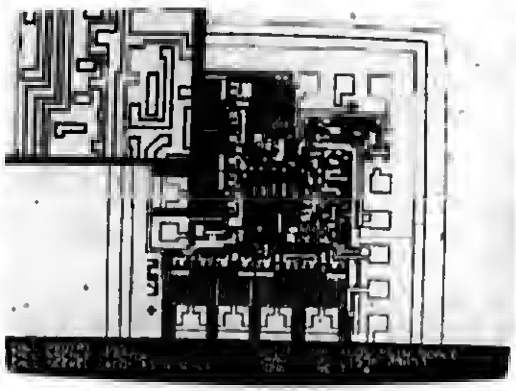
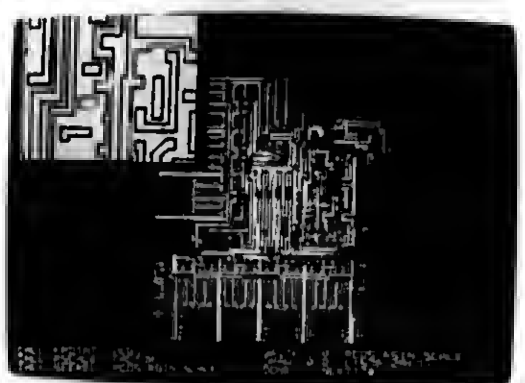

2. All graphics.


3. Alpha-numerics & graphics.


4. Graphics & View-window.


5. Alpha-numerics, graphics & View-window.


6. Alpha-numerics, Graphics & View-window (with reversed-out section).

To begin with, the IGT-100's special three-way, split-screen design provides you with separate alphanumeric, graphics and view-window sections.

Plus the ability to independently view and control (i.e. panning, zooming, etc.) one or a combination of these sections simultaneously.

Images can even be reversed (white on black) in the graphics and view-window sections.

The IGT-100's basic screen design maximizes the amount of data that can be displayed while providing you with six basic screen arrangements. Annoying superimposed messages have been totally eliminated.

It's about time someone came up with a screen that you can tailor to fit the job — instead of the other way around. And that's exactly what we did.

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Price shouldn't be the primary consideration when you're looking for a full-powered graphics terminal.

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Users Able to 'Own' Data In Distributed Data Bases

By Stephen L. Robinson
Special to CW

Data Base Corner

Every few months, it seems, there is a new technique, a new buzzword, guaranteed to revolutionize data processing. In the last few years we've heard about data base, intelligent terminals, bubble memories, microprocessors, EFTS and packet switching — to name but a few.

In part, the development and popularization of new techniques is a sign of the dynamic nature of our industry. The way we grasp for these new techniques is a sign of dissatisfaction with the status quo.

Consider data base systems. The concept has been developing for several years and data base packages sales are accelerating. However, all is not well in the world of data base.

Inherent in the development of a true data base system is a change in the philosophy of data management (see "Data Base Corner," CW, May 2). This change has not been very popular in many organizations.

Functional areas have lost "ownership" of their data. The concept of distributed data base systems, which would tend to restore some data ownership to functional areas, is therefore greeted with huzzahs that do not reflect all the technical and management problems associated with distributed data.

What Is It?

Let us first distinguish between distributed data processing and distributed data base; and then distinguish between types of distributed data base systems. (Note: the combination of distributed data base and distributed data processing is also clearly possible.)

Put very simply, a distributed data processing system consists of:

- A number of nodes (locations which may contain one or more input devices, computer configurations or output devices).
- The capability to enter a "job" at one node and have the "system" decide where to run the job (alternatively, the user may specify a particular node for the job).

Usually, a job submitted to a distributed DP environment carries with it a description of where its input data is to be found.

In a distributed data base system, a job is typically run at its own "home node," but the requisite input data is distributed at other nodes.

Data Base System Types

We should distinguish between two types of distributed data base systems. In a *static distributed system*, a prospective user must "know" which node has the data that is required. That is, a call for data must specify a node.

In a *dynamic distributed system*, a prospective user need not specify where the requisite data is to be found. Indeed, users will not know where the data is stored. The "system" will maintain a data dictionary of data element names, and aliases, and will generate data requests to the appropriate nodes.

Although I know of several operational static systems, I am not aware of any full-blown dynamic systems. The potential flexibility and adaptability of a dynamic system augurs well for the next five to seven years.

In the interim, static systems offer some interesting advantages over centralized data base systems. In particular, functional areas may once more "own" their data and they may organize their data to optimize their applications.

Following are some disadvantages of distributed data:

- Backup, recovery and restart are tougher problems.
- Synchronization of redundant data can be quite complex.
- Security/privacy issues are complicated.
- Performance of internode applications may degrade to the extent that functional areas may retreat into file system isolationism.
- The unknown always holds surprises.

There are, of course, many additional arguments — both for and against distributed data base systems. I would welcome reader descriptions of operational distributed data base systems — and especially reports on benefits and problems.

Robinson is an independent consultant, having recently organized S.L. Robinson & Associates, 517 N. Pennsylvania Ave., Morrisville, Pa. 19067.

'Plotall' Aids Graphics Work

AKRON, Ohio — The Plotall language developed by the University of Akron enables non-DP-trained people to use an IBM 360/370 to create a variety of graphics without getting involved at a programming level.

Plotall can be used to create line graphs, pie and bar charts, histograms and other "art work" that adds impact and understanding to verbal or written reports. The system supports four types of calendar and logarithmic axes, shading for pie and bar charts and up to six lines of title and text information, a spokesman noted.

Output Variable

The plotting software is basically designed to produce 8-1/2-in. by 11-in. output, but this can be adjusted — to larger or smaller dimensions — through control card entries prior to execution, he said.

Plotall is written in a combination of IBM's Assembler language and Fortran, for use with 360/370 systems equipped with Calcomp plotters. Access to all Calcomp plot routines is through individual subroutines provided to the user so that various graphics devices can be used.

License agreements to use Plotall, which functions under both OS/360 and OS/VS environments, cost $500 for educational institutions and $1,000 for industrial users.

More information is available from the Plotall Coordinator, University of Akron Computer Center, Akron, Ohio 44325.

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23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
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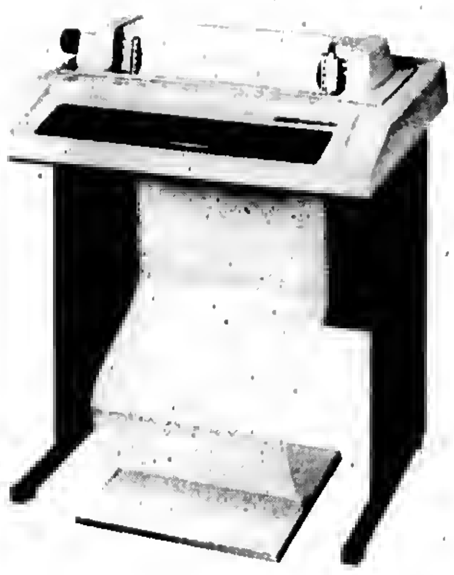

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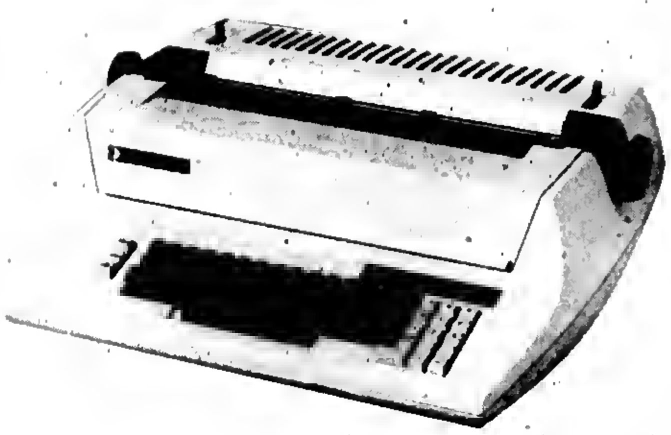

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Wednesday, November 2

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A special feature of the Conference this year will be a major study on **Human Resources Programs: Costs and Results**—prepared at the University of Minnesota.

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First participant—$425. Second participant from same organization—$400. Third or additional participant from same organization—$375 each.

Cancellations and Refunds. Confirmed reservations may be cancelled up to October 14. Participants who have not cancelled reservations on or before October 14 are subject to the entire fee. Substitutions may be made at any time.

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Program

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Sunday, October 30

7:00-11:30 p.m.—Registration

7:30-9:30 p.m.

Early Bird Welcome Party
Wine ,Cheese, and Music

Monday, October 31

7:30-9:00 a.m.—Registration

9:00-9:30 a.m.

InSci in Transition
Dale H. Learn, President, Information Science Incorporated

9:30-10:30 a.m.

Jobs—Who Should Provide Them And How
Edward Brooke, U.S. Senator, Massachusetts

10:45-11:45 a.m.

Critical Role Of Personnel Management In Todays Corporate Environment
Russell N. Freund, Vice President, Personnel, Philip Morris, Incorporated

12:30-2:30 p.m.

Lunch

From Space To Human Resources
Edgar D. Mitchell, President, EMCO; Apollo 14 Astronaut

2:30-5:00 p.m.

Concurrent Workshop Sessions

Legal Implications of Recent EEO Suits For The Corporate Community
Session Leader: Thomas Phalen, Esquire, Phalen

Using The Computer For Manpower Planning And Forecasting
Session Leader: Bob Flast, Manager, Human Resource Analysis, International Paper Company

Basics of Computerized Personnel Information

HRS In The Health Care Environment

Development Focused Performance Appraisal
Session Leader: Neil Thompson, Vice President, Blessing, White

Basics Of The General Retrieval System

The Politics Of Human Resource System Implementation
Session Leader: Alan Bell, Senior Associate, Applied Management Sciences, Warner-Lambert

System Upgrading Considerations In A Large Diversified Company
Session Leader: David Bowers, Programming Manager, AMF, Incorporated

Minicomputers And The Personnel Function

OnLine HRS And Banking
Session Leaders: Martin Benjamin, System Analyst, National Bank Of North America, David Witalis, EDP Officer, First National State Bank of New Jersey

The Data Analyzer
Session Leader: Sherman Drusin, Vice President, Program Products, Incorporated

The Think Tank Approach And The Human Resource System
Session Leader: Pat Coyne, Manager, Employee Relations and Personnel Systems, Amstar

5:30-7:30 p.m.

Reception

Cocktails, Music, Hors d'oeuvres

Tuesday, November 1

9:00-10:00 a.m.

Privacy As It Relates To Employment
Abraham Ribicoff, U.S. Senator, Connecticut

10:15-12:30 p.m.

Concurrent Workshop And Case Study Sessions

Establishing An HRS In Canada
Session Leader: Mike Villani, HRS Coordinator, Steinbergs Limited

HRS/Payroll Entry via Remote Terminals
Session Leaders: Walter W. Tullis, Director, Personnel Information System, Fireman's Fund Insurance Company, Joseph Marzo, Senior Systems Analyst-Personnel, Fireman's Fund Insurance Company

New On-Line Capability With Your Batch HRS
Session Leader: Michael J. Parrella, President, Decision Strategy Corporation

Implementing A Payroll System
Session Leader: Lee Elliott, Manager Corporate Systems, Allendale Insurance Company

Skills Profiling And Career Management

Benefits: Employee Orientation Techniques
Session Leaders: Dorothy Needham, HRIC Manager, Foley's, Lorah Gough, HRS Project Manager, Foley's

Using The Computer For EEO Compliance And Affirmative Action Planning

Motivation And Organizational Behavior
Session Leader: Samuel B. Marks, Director of Government Services, American Management Association

Case Studies

Health/Safety Administration And The Computer
Harvard Graduate School of Business Administration

The Corporate HRS And Privacy
Harvard Graduate School of Business Administration

12:30-2:30 p.m.

Lunch

Human Resources Programs: Costs and Results
William Pyle, Ph.D, Director, Human Resource Research Programs, University of Minnesota

2:30-5:00 p.m.

Concurrent Workshop And Case Study Sessions

The Handicapped: Personnel Policies And Practices
Session Leader: Harold E. Krents, Esq., Surrey, Karasik & Morse

Computerizing Benefit/ERISA Information
Session Leader: Connie Combs, Assistant Vice President, Manager of Personnel Information Management, Valley National Bank

Successfully Managing The Human Resource Information Center
Session Leader: John Westenkirchner, Personnel Systems Administrator, Owens Corning Fiberglas Corporation

The Integrated Personnel/Payroll System
Session Leaders: C. Nolan Richardson, Director of Data Processing, Jerry Browning, Manager Systems and Procedures, Sonoco Products

Graphic Reporting For Personnel Management
Session Leader: Paul Kalbach, Vice President, Program Products, Incorporated

Implementing A Minicomputer-Based Personnel Information System
Session Leaders: Jim Fleming, Manager. Personnel Information System, Philip Morris, Incorporated, Errol Johnson, HRS Coordinator, Philip Morris, Incorporated

Development Of A Personnel Automation Plan In The Banking Industry
Session Leader: Gregory MacNeil, Assistant Vice President, Chemical Bank

Human Resource And Cost Accounting The Real Cost of Compliance
William Pyle, Ph.D, Director, Human Resource Research Programs, University of Minnesota

Case Studies

Health Safety Administration And The Computer
Harvard Graduate School of Business Administration

The Corporate HRS And Privacy
Harvard Graduate School of Business Administration

Wednesday, November 2

9:00-10:00 a.m.

What To Expect From The OFCCP As It Enforces The Law
Weldon Rougeau, Director, Office of Federal Contract Compliance Programs

10:15-11:15 a.m.

The Role Of Computer Technology In Airforce Human Resources Management
Brigadier General H. L. Emanuel, Deputy Assistant DCS/Personnel For Military Personnel

12:00-2:00 p.m.

Lunch

The Human Dimension Of Affirmative Action
Harold E. Krents, Esq., Surrey, Karasik & Morse

2:00-4:30 p.m.

Concurrent Workshop Sessions

Minicomputers: Pros And Cons

Use Of IMS In Personnel/Payroll Systems
Session Leader: Douglas J. Cotts, Director, Data Base Assistant Team, Automated Concepts, Inc.

New Uses For The Human Resource System
Session Leader: Kirk Honold, Corporate Manager, Personnel Systems, Baxter Travenol Laboratories

Medical/Health/Safety
Session Leaders: Curtis D. Bowden, Manager Safety and Health, Florida Steel, Phil Dandridge, Manager, Personnel Administrative Services, Springs Mills

Further Uses Of The General Retrieval System

Controlling Manpower Costs In Banking—Forecasting, Analysis And Implementation
Session Leader: Judy Nelson-Moore, Assistant Personnel Officer, First National Bank of Denver

Benefit Statements
Session Leader: Cathy Lowenbraun, Insurance Manager, Kane-Miller Corporation

Management Interaction With HRS
Session Leader: Jesse Romer, Personnel Officer-HRS, United Virginia Bankshares, Inc.

Security Considerations Of A Personnel System

The Personnel System In A Highly Decentralized Industry
Session Leader: John Gandolfo, Manager, Personnel Systems, ARA Services, Inc.

Implementing Point Of Sale Input Mechanism For Hours/Earning
Session Leader: Mal Hightower, Manager, Systems/Programming, U.S. Specialty Retailing

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School Days

Software Key To Sessions In New York

NEW YORK — "Software: Project Management, Tools and Techniques, New Developments" is the title of a two-and-a-half day conference to be presented by the American Institute of Industrial Engineers (AIIE) at the Hotel Roosevelt here, Oct. 17-19.

The meeting will include plenary sessions, the first day; workshops examining the impact of evolving technology, the second day; and a panel discussion analyzing software quality and conflicting trends.

Registration fees is $265 for AIIE members and $295 for others, with "team" discounts available. The seminar is being run by Management Education Corp., P.O. Box 3727, Santa Monica, Calif. 90403.

Career Concerns Covered in D.C.

WASHINGTON, D.C. — "How to Succeed in the World of EDP," a seminar described as the premiere presentation of the special interest group on career counseling of the Association of Computer Programmers and Analysts (Acpa), will be held this coming Saturday, Sept. 24, at the Quality Inn Central, Arlington, Va.

Topics ranging from individual career development and purpose of the resume to interview techniques will be considered during the working sessions. Jack Stone, author of *Computerworld*'s "Human Connection" column, will speak at lunch.

Registration fees now are $40 for Acpa members and $55 for others, with a $30 fee for students, the association said. Registrar is Linda Miller, 7708 Hanover Parkway T-3, Greenbelt, Md. 20770.

System Sessions Set in 2 Cities

ROCKVILLE, Md. — Effective Data Systems Development will be the subject of a three-day seminar by Barnett Data Systems in Houston and in Washington later this year.

The $425 course will be in Houston on Oct. 25-27; in Washington on Nov. 7-9 and again on Dec. 5-7. A one-day briefing keyed to the "problem definition" portion of systems work will be presented in each city, for $155/person, the day after the longer seminar.

Barnett Data Systems is at 19 Orchard Way North, Rockville, Md. 20854.

Topic: Tuning

DELRAN, N.J. — Datapro Research Corp. has scheduled a seminar on "Computer Performance Measurement: Tools and Techniques for Increased System Productivity" in four cities this autumn.

The seminar will be in Washington, D.C., Oct. 24-26; in San Francisco, Oct. 31-Nov. 2; in New York, Dec. 7-9; and in Chicago, Dec. 14-16. Cost is $425 for current Datapro subscribers and $475 for others, the company said from 1805 Underwood Blvd., Delran, N.J. 08075.

Management To Be Theme

NEW YORK — Each registrant attending the "Management Skills for the Systems Professional" seminar in late October will be assigned to work with a small group of other managers who have similar backgrounds and expertise, according to the American Management Association.

By working out solutions to simulated problems and presenting their findings to the entire class, participants should learn ways to organize the systems department, to interview potential employees, to train the systems team, to allocate personnel and set priorities, a spokeswoman said.

Running from Oct. 31 through Nov. 4, the course costs $610 for AMA members and $700 for others. The association is at 135 W. 50th St., New York, N.Y. 10020.

HP and College To Teach APL

FULLERTON, Calif. — Four independent but related seminars will be offered here late this month and in October by Orange Coast College and Hewlett-Packard Co.

The seminar schedule includes "A Manager's Hands-On Guide to APL on a Mini," Sept. 20; "Hidden Computer Treasures for Financial Executives," Sept. 27; "Engineering and Scientific Applications," Oct. 4; and, "Far Out APL," Oct. 11.

Sessions start in late afternoon and continue until 10 p.m. at the Hewlett-Packard Data Center here in Fullerton. The $48 registration fee for each seminar includes a buffet dinner, the APL seminar coordinator said from 1430 E. Orangethorpe Ave., Fullerton, Calif.

Productivity Ideas Offered

McLEAN, Va. — Courses on DP productivity improvement are being offered by Johnson Systems, Inc. this fall.

Johnson schedules three consecutive courses each week, including one on the basics and another on advanced techniques for use of the company's Job Accounting and Reporting System (Jars) package.

The third course is not Jars-oriented. Topics include Computer Performance Management, Hardware/Software Planning and Evaluation and Design and Implementation of a Data Center Chargeback System.

The Jars courses are included in the $295 fee charge for single courses, the spokesman noted from 8400 Westpark Drive, McLean, Va. 22101.

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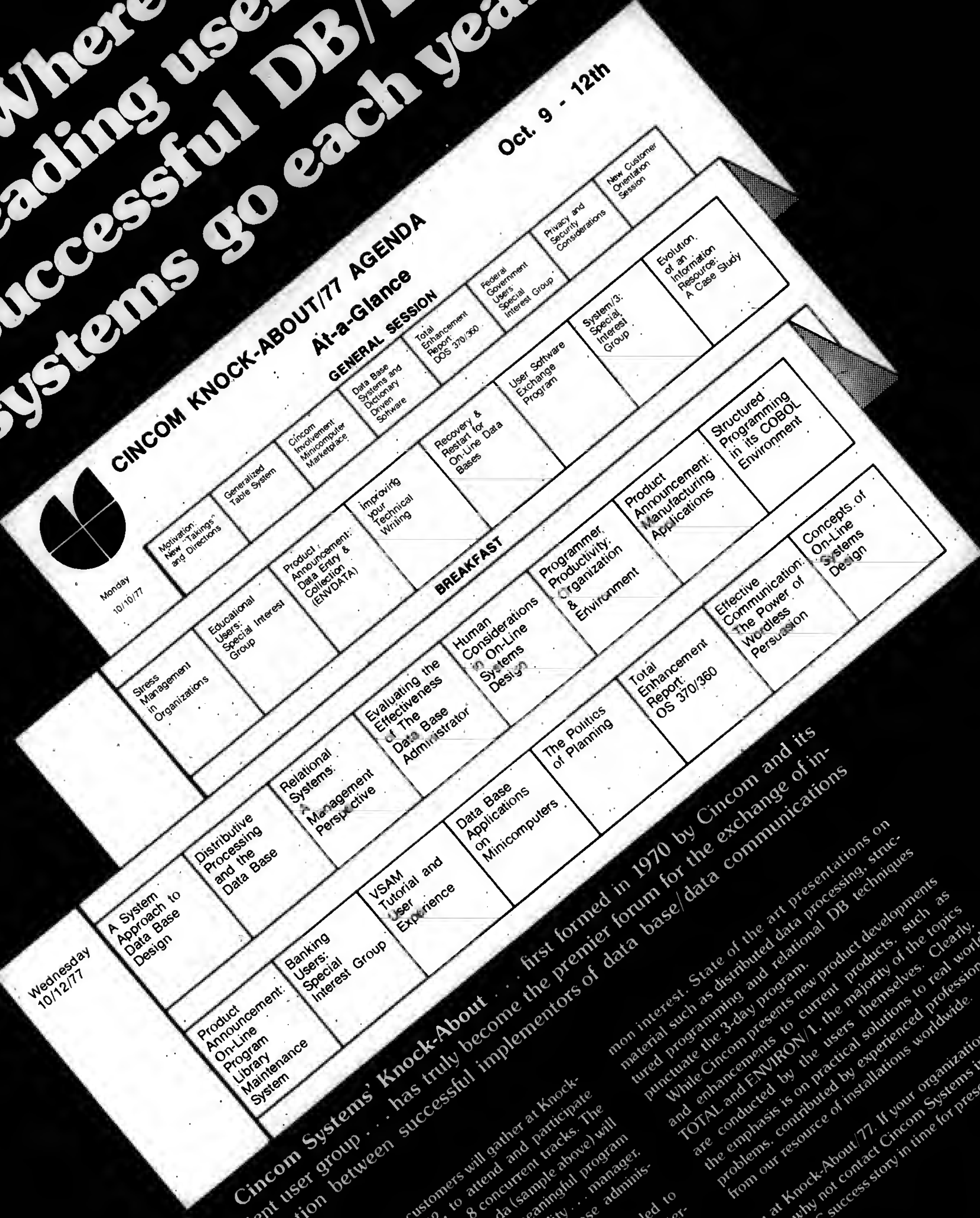

CINCOM KNOCK-ABOUT/77 AGENDA

At-a-Glance

Oct. 9 - 12th

Monday 10/10/77

GENERAL SESSION

Motivation: New "Takings" and Directions

Generalized Table System

Cincom Involvement: Minicomputer Marketplace

Data Base Systems and Dictionary Driven Software

Total Enhancement Report: DOS 370/360

Federal Government Users' Special Interest Group

Privacy and Security Considerations

New Customer Orientation Session

Educational Users: Special Interest Group

Product Announcement: Data Entry & Collection (ENVDATA)

Improving your Technical Writing

Recovery & Restart for On-Line Data Bases

User Software Exchange Program

System/3: Special Interest Group

Evolution of an Information Resource: A Case Study

BREAKFAST

Stress Management in Organizations

Human Considerations in On-Line Systems Design

Programmer Productivity: Organization & Environment

Product Announcement: Manufacturing Applications

Structured Programming in its COBOL Environment

Evaluating the Effectiveness of The Data Base Administrator

Total Enhancement Report: OS 370/360

Effective Communication: The Power of Wordless Persuasion

Concepts of On-Line Systems Design

Wednesday 10/12/77

A System Approach to Data Base Design

Distributive Processing and the Data Base

Relational Systems: A Management Perspective

The Politics of Planning

Product Announcement: On-Line Program Library Maintenance System

Banking Users: Special Interest Group

VSAM Tutorial and User Experience

Data Base Applications on Minicomputers

Cincom Systems' Knock-About . . . first formed in 1970 by Cincom and its client user group . . . has truly become the premier forum for the exchange of information between successful implementors of data base/data communications systems.

Over 600 Cincom customers will gather at Knock-About/77, October 9-12, to attend and participate in 75 sessions presented in 8 concurrent tracks. The breadth and depth of the agenda (sample above) will enable each person to tailor a meaningful program to his or her professional responsibility . . . manager, system designer, programmer, data base administrator, on-line specialist, etc.

Special interest groups have been scheduled to provide the opportunity for industry-oriented interaction and in-depth discussions of subjects of common interest. State of the art presentations on material such as distributed data processing, structured programming and relational DB techniques punctuate the 3-day program.

While Cincom presents new product developments and enhancements to current products, such as TOTAL and ENVIRON/1, the majority of the topics are conducted by the users themselves. Clearly, the emphasis is on practical solutions to real world problems, contributed by experienced professionals from our resource of installations worldwide.

If you are a Cincom customer, we hope to see you at Knock-About/77. If your organization is considering data base or data communication software, why not contact Cincom Systems immediately. We can help you prepare your organization's DB/DC success story in time for presentation at the next Knock-About (April, 1978).

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But PADs are Coming

X.25 Seen Awkward for Data Net Users

By Ronald A. Frank
CW Staff

TORONTO — The migration to packet switching is "particularly awkward" for data communications users because terminals adapted to the X.25 protocol standard are no longer operable on private lines or switched circuits, according to Louis Pouzin of France.

Speaking at a recent Conference here, Pouzin, for the French research institute IRIA, said the recent adoption of X.25 as a packet network standard has led computer terminal suppliers to introduce a variety of network architectures in answer to IBM's Systems Network Architecture (SNA).

"Every manufacturer is developing systems designed to tie up customers in a maze of specific products, all cunningly interdependent," Pouzin said.

The X.25 protocol allows setting up and clearing connections through virtual circuits. The virtual circuit is like a switched connection except that it is virtual. In terms of service characteristics, X.25 imposes transit delays typically between .5 sec and 1 sec; fixed packet formats; transmission procedures; several connections multiplexed on a single access circuit; and no error conrol end-to-end, Pouzin said.

'Total Incompatibility'

The X.25 protocol exhibits "total incompatibility" with previously defined public data networks, and the number of deficiencies identified with it "foretells a substantial revision," he said.

Since X.25 does not fit any existing equipment, it "is not very saleable." Because of this, the carriers have introduced the Packet Assembler/Disassembler (PAD), which is implemented in a terminal controller. Terminals supported by the PAD controllers must be either start/stop type operating at 110 or 300 bit/sec and must use Ascii code, Pouzin said. This year will be the year of the PAD within CCITT, with a strong drive to get a specification approved, he predicted.

On the other hand, the subject of X.25 consistency with other data communication services will not be given much attention within the standards-making body this year, he said.

The adoption of X.25 by the CCITT was the result of "worldwide salesmanship and rough pushing" which led to unanimous approval, although no votes were recorded, Pouzin said.

The standard was approved through the combined efforts of Bell Canada, Telenet Communications Corp. and the French and United Kingdom postal administrations. The X.25 protocol is basically a "carbon copy" of a procedure designed by Telenet for its own use and Telenet was the most influential carrier favoring its adoption. This was because Telenet is the only carrier operating in the packet switching area without cross subsidization.

Describing Telenet as a specialized carrier in the U.S., Pouzin said it does not offer a "full range of consistent public services." But turning a Telenet product into a CCITT recommendation "is certainly a highly prized reward for the company and explains why packet-switching services are out of context with other public data communications services in other countries," he said.

Telenet provides everything either as part of its network or as software packages for customer equipment. But the carrier is not selling a virtual circuit service. Instead, it is offering remote terminal handling and procedure conversion.

The next logical step will be a complete service for users in one of four one possible forms:

- Computer manufacturers provide converters and remote controllers to go with them.
- Entrepreneurs build and sell/rent converters and remote controllers.
- Entrepeneurs put up all necessary gear and sell composite services based on public data communications services.
- Carriers provide composite services.

The carriers will be dependent on the vendors' willingness to put X.25 interfaces in their products. The carriers would like to impose the network terminal access methods on the manufacturers so that "the whole terminal-handling business falls under carrier control," Pouzin said.

Users are realizing that building a system out of heterogeneous components may result in considerable economies. But in order for this to happen, common protocols are needed and boundaries of responsibility must be clearly defined, he said.

Terminal-Based Turnkey Helps Pharmacy With Recordkeeping

FORT WORTH, Texas — Pharmacists are discovering that a computerized communications network can provide a new prescription for an ailment as old as drug stores themselves.

That "ailment" is an overabundance of repetitive, routine, time-consuming tasks like typing prescription labels, storing patient profiles and family records, updating inventories and drug prices and processing Medicare and Medicaid paperwork.

The remedy is a $20,000 turnkey minicomputer system called "System 31", which features a mini-CRT terminal/keyboard by Informer, Inc. of Los Angeles.

Operated by V.C. Brown, Inc. of Fort Worth, the system serves nearly 100 pharmacies, and Brown officials claim the market is growing. The system, which has taken six years to develop, incorporates a Computer Automation, Inc. LSI-2 minicomputer, a Centronics Data Computer Corp. and the Informer Models 301 and 302 mini-CRT display screen and keyboard.

Dalton Carter, who owns Carter Pharmacy in Fort Worth, is so proud of his computer he advertises it in the Yellow Pages. His ad reads "Complete computerized prescriptions records for major medical and income tax."

"The first year I had the computer," Carter said, "I watched closely to see if it really would pay for itself. In that first year, I found that it saved me $11,500 by just keeping up with wholesale price increases on refills, not to mention the relief on handling the paperwork for Medicare and Medicaid."

Carter, whose small pharmacy fills an average of about 100 prescriptions a day, said he had four clerks to handle the third-party paperwork before he began subscribing to the computer system. Today, he employs two clerks.

"It's obvious that I can take two salaries and pay for the computer," he said. "When I came into the business, wholesale drug prices hadn't changed in 40 years. Now, with everyday's mail, we get price changes. And with welfare, etc., you have such a low margin that you've got to grab every penny to make a profit."

Carter said the V.C. Brown System 31 wouldn't be the same without the small Informer terminal. "I love it," he said. "It's obvious why. The terminal takes up very little space. There's no point in its being any bigger than it is. You've got all the information you need; and no more."

Bob Glenn, Brown's national sales manager, said one of the mini-CRT terminal's advantages, is its smallness. "You're talking about counter space that the pharmacist uses for everything," he explained. "Informer's terminal is 6 by 20 in. and has a pedestal-mounted six-in. CRT screen that stands 10 in. tall. It weighs 10 pounds and is easily moved around."

(Continued on Page 45)

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Clients Do Own Banking With Wall-Mounted 'Teller'

S. LAWRENCE, Mass. — Bay State National Bank has installed an IBM self-service banking terminal at its Winthrop Ave. branch here.

Called Instabank, the IBM 3614 consumer transaction facility has been installed in the branch's outside wall, permitting the bank's customers to make the following transactions:

- Withdraw cash in $5 and $20 denominations from savings or checking accounts, up to a daily limit of $250 from either account or a combined total of $350.
- Make deposits to checking or savings accounts.
- Transfer money from one account to another.
- Make installment loan, mortgage, Master Charge or club payments.
- Obtain current checking or savings account balance.

IN$TA-BAN
Bay State National

Bay State National Bank has installed an IBM 3614 consumer terminal at its Winthrop Ave. branch in South Lawrence, Mass., as part of an IBM 3600 finance terminal system.

"Instabank provides customers with the convenience and privacy of 24-hour banking every day," according to assistant vice-president John C. Hersey.

To initiate a transaction on the 3614, a customer inserts a plastic magnetic stripe identification card — called Instacard — into the terminal, which is connected to the bank's central IBM 370 CPU. After the card is validated, a display panel instructs the customer to enter a secret code number at the keyboard.

Then, guided by messages on the display panel, the customer presses a series of keys to indicate the transaction and its amount. After each withdrawal, the system debits the customer's account and returns the card.

When depositing funds or making loan payments, the customer presses the appropriate keys and inserts an envelope — containing payment documents, checks or cash — into a covered deposit slot. Customers also can make payments by inserting an envelope containing a payment stub or coupon and keying instructions to deduct funds from their checking or savings accounts.

The bank also has begun using teller-operated terminals in all 10 of its branches. All units are part of the IBM 3600 finance communication system.

The terminals include keyboard display units and passbook/document printers linked to the central computer, the bank said.

Spectron Devices Gain Send/Receive Option

MOORESTOWN, N.J. — The Spectron Corp. has introduced a send/-receive option for its T-511 tape unit.

Data recorded on tape by a Spectron Datascope D-601 or on a T-511 can be transmitted between two T-511s equipped with the option.

Data can be sent between sites in simplex operation, a spokesman said.

The purchase price of the option is $800; previously delivered units can be retrofitted at a cost of $960, the firm said from 344 New Albany Road, Moorestown, N.J. 08057.

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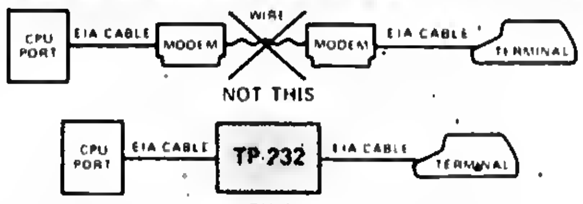

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More Hookups Under Way

SNA-Based Net Links Mexican Bank Branches

Special to CW

A sophisticated tele-information network based on IBM's Systems Network Architecture (SNA) concept (and utilizing Vadic-licensed 1,200 bit/sec and 2,400 bit/sec CCITT-compatible modems) is now in use at Multibanco Comermex of Mexico City. The system places Multibanco Comermex in the lead within the Mexican banking industry for farsighted uses of data communications technology.

A desire to provide better daily services motivated the bank's directors to implement a comprehensive computer service expansion plan.

A fundamental requisite was a greater integration within the bank's offices throughout the country over a reliable data transmission network.

Once such a network was established, Multibanco Comermex decided to install backup systems both at the computer and at the telecommunications equipment levels.

To obtain the high levels of efficiency required, the use of distributed intelligence technology was supported by a high-level synchronous communication protocol.

One of the bank's objectives was to use modems manufactured in Mexico. It contacted the General de Telecommunicaciones S.A., who supplied modems manufactured in Mexico under license from Vadic Corp.

Two types of modems were licensed by Vadic: the VA-1200L CCITT V.23-compatible 1,200 bit/sec modem; and VA-2400L CCITT V.26-compatible 2,400 bit/sec modems.

The network is supported in a data processing center (CPD) and a data telecommunications center (CTD) located in Mexico City.

Multibanco Comermex also offers a consultation and protection telephone service to remote and branch offices, in case of catastrophic failure, such as power outage, at a remote office.

Installation of controls for remote terminal management of provincial branch offices has been planned, and integration of remote offices in the country's interior has already been started.

Network Configuration

The Multitronic network, based on the IBM 3600 financial system, includes an IBM 370/125, a 370/135 CPU and two IBM 3704 communication processors to provide redundant on-line operation.

Normally, the 370/135 is used on the first and last days of the week and on the 15th and 30th of each month (the bank's pay days).

Each 3704 communications processor is capable of managing the entire network, because of data divider bridges, following the VA-2400L modems.

The bridges accept four IBM terminal controls, backing up both the 1,200- and 2,400 bit/sec modems, which are housed in 16-channel multiple mounting racks.

The telephone lines are backed by a half-duplex line which is normally connected to the CCD in case of emergency.

Because of multipoint operation, the network can maintain eight branch offices with each 3601, of which there are currently nine in the system.

Emergency measures may also be taken to prevent any one branch in the multidrop loop from blocking the other branches in the same loop.

At present, the system as 46 branches, most of them in the metropolitan area of Mexico City. The system contains 140 data terminals linked by the Vadic-licensed modems.

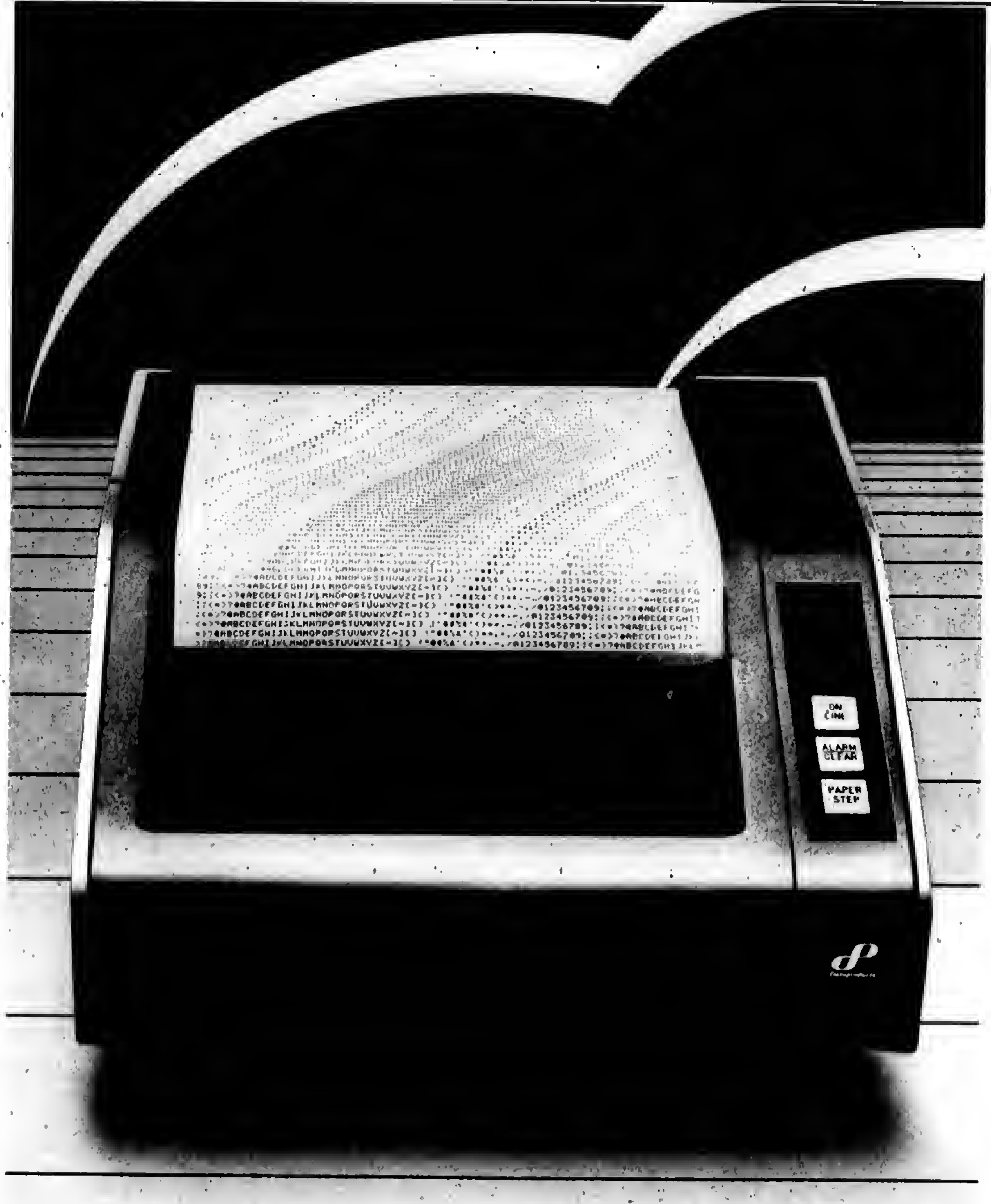
The 1,200 bit/sec modems are used at the branch level, while the 2,400 bit/-sec modems are used at a higher level. The system is used for debits, credits and inquiries on checking and savings accounts and loans.

Software used is IBM's Virtual Telecommunications Access Method/Extended Telecommunications Module (Vtam/EXTM) in the 370 CPUs Network Control Program/Virtual Storage NCP/VS in the 3704 communications processors; and Synchronous Data Link Control (SDLC) protocol for data communications. SDLC is compatible with the International Standards Organization's (ISO) proposed High-Level Data Link Control (HDLC), which has been adopted by France, Canada and other countries as a base for their public data networks.

Informarica y Telecommunicaciones S.A. is also involved, developing an efficient, simple system for switching to back-up equipment, plus a diagnostic and control system with a display panel to inform the CTD operator of the network status and to provide control of back-up switching from the panel.

Analog signal levels, noise levels on the telephone lines and digital interface signals from the 1,200- and 2,400 bit/sec modems can be monitored.

The Multitronic network reportedly is the first of its kind in Latin America to employ SNA. With this architecture, Multibanco Comermex achieves better integration with its finance group and can offer better service to clients and officials alike.



Services Firm Credits Net With Revenue Rise

SILVER SPRING, Md. — Because it converted to a national data communications network, a remote computing services firm here will double its revenues during the next year, the company's president predicted.

Dialcom, Inc., began using the Tymnet, Inc. communications network after executives in the computing services firm realized they wold have to make Dialcom's services more accessible to its customers, which include government agencies, financial institutions and businesses.

"Tymnet offered the only network service which met all our criteria," Dialcom president Robert F. Ryan recalled.

To save money, Dialcom in the past installed local dial-up lines in only a few high-density cities like Baltimore, New York, Philadelphia, Minneapolis and Pittsburgh. Because of rapid company growth and customer demand for access in other U.S. cities, however, the firm's management conducted a study of national network common carriers in early 1976.

Criteria for the selection of a network included the ability to base the network at Dialcom's computer facilities here, to provide Bell 113B-compatible transparent hookups and to cover many major U.S. metropolitan areas.

Even more important, the company demanded reliability and performance to ensure a level of quality acceptable to Dialcom's network customer base, Ryan said.

"An important reason we selected Tymnet," he continued, "was its history and experience with our industry. Because Tymnet has conveyed the services of Tymshare, Inc., for many years, it was my feeling that Tymnet would relate to the problems of a time-sharing concern better than the other common carriers."

Node Replaced

During December 1976, when Dialcom began using the Tymnet operation; surging volume forced the company to replace the original network node — a Varian 620L, wth 30 ports — with a Varian V72, 62-port configuration. Management attributed the change to increasing customer additional access points. Approximately 50% of Dialcom's customers draw usage in more than one location.

The network allows Dialcom to compete on a national level in additional areas of marketing like data collection and accessing of common data bases for large multi-city firms. By using Tymnet, Dialcom believes it can better serve the associations and corporations utilizing its software products, Ryan noted.

Dialcom's most widely offered services include a word processing correspondence tracking system and Federal Assistance Programs Retrieval System for state and local government agencies. It also offers software packages for business, accounting and engineering.

Dialcom does its processing at its dual-computer facilities here, which house four Honeywell 1648 time-sharing systems. The company plans to install an additional Honeywell 1648 system this year.

The company's 1976 estimated revenues will exceed $1.5 million, an increase of approximately $500,000 over the previous year.

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Pharmacy Using Turnkey System

(Continued from Page 41)

System 31's disk memory stores about 70,000 accounts, enough to last the average pharmacy two years without purging. When a customer comes in for the first time, a druggist enters information like doctor's name, customer's name and account number, code of directions, allergies, drug name, quantity, price, cost, number of refills, predetermined fees and number of lables to print into the system.

When an account is established, a refill or new prescription takes only a few seconds.

Among its other functions, the system checks drug prices to ensure they are current; checks refill numbers to be sure the authorized number of refills have not been exceeded; updates family records; creates billing files for third-party payment; and prints prescription labels.

Another advantage of the CRT terminal is the ability to program private reminders on various customers, Glenn said. "You have all sorts of people walking into pharmacies," he explained. "You may only want to accept cash from some. Others may be suspect drug abusers or shoplifters. You can get a private message on the screen whenever that customer's number comes up and it will never be printed anywhere else that it could cause you embarrassment if it got into the customer's hands."

Carter described the network as nothing more than a sophisticated file clerk and filing system," which is exactly what he said his pharmacy needed. "Previously, we had two manual file systems, and if you had 10 or 15 refills on a prescription, you thumbed through them so many times you couldn't read the number," he recalled.

"Now, the pharmacist just takes the label off the printer and it's legible, the information is there in the same form every time and the drug prices are current."

You don't have to think big

One of the biggest names in big computers just became one of the biggest names in small computers.

Because Sperry Univac just acquired Varian Data Machines. Lock, stock, and slide rule.

From now on, Varian's complete line of mini's will be brought to you by the minicomputer operations of Sperry Univac. The whole family—from the world's first mainframe on a board to the top of the line—will carry the Sperry Univac label.

Of course, these machines were always a good buy. But now they're assured of all the service and support that Sperry Univac can command. All the former VDM employees, all the dollars, all the dedication.

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The fact is, Sperry Univac is going to be a big success in small computers.

Sperry Univac. Mini's that think like mainframes.

SPERRY UNIVAC

SPERRY UNIVAC IS A DIVISION OF SPERRY RAND CORPORATION

Infoton Adds Two CRTs

BURLINGTON, Mass. — Infoton Corp. recently introduced two CRT terminals. The 1200 is a Teletype Corp.-compatible display terminal with standard bottom-line entry and full-screen entry operating modes.

Features of the terminal include a 1,920-char. display in a 9 by 9 dot matrix format, RS-232C and current loop interfaces, 16 switch-selectable transmission rates from 50- to 19,200 bit/sec and a capacitor scan detachable keyboard, according to an Infoton spokesman.

Command functions of the 1200 enable X/Y cursor addressability, erase line or screen, and keyboard lock or unlock, he said.

Options available include upper/lower case printing, a printer interface, answerback, numeric keypad, function keys and non-scroll page mode of operation, Infoton noted.

The Model 1400 is said to be a multifunction CRT terminal which utilizes the full Ascii code set and is microprocessor based.

Features of the terminal include all those standard on the 1200, as well as character or block transmission, cursor control cluster, a numeric pad and editing capability, the spokesman noted.

Additional command functions on the 1400 include cursor sense, reverse video, and underline field.

The 1200 costs $1,195 in its basic form; and the 1400 is priced at $1,595, the spokesman noted from Second Ave., Burlington, Mass. 01803.

Microprogrammed System

CRT Does Publishing Jobs

CORNWELLS HEIGHTS, Pa. — Delta Data Systems (DDS), has introduced a video display terminal that its manufacturer claims minimizes errors in text processing applications. Dubbed Delta 4300E, the microprogrammed terminal incorporates a 4K-char. memory expandable to 8.5K char.

Designed exclusively for organizations like newspapers, publishing houses and other communications firms, the terminal provides text-manipulation features that include automatic word wrap, automatic ragged right sentence and paragraph justification and automatic justification of new insertions, the firm said.

In addition, four automatic search modes are possible including searching test for a specific word or word string; search and replace each occurrence in text with a new word or word string; search and replace upon request; and search and delete each occurrence in text of a specific word or word string.

Moves, Copies Text

Other features include the ability to move/copy/delete any defined text from the terminal's memory. The unit has an automatic carriage return. Memory preservation prevents loss of data and signals the operator when a character is added or inserted into a full memory, DDS added. To help conserve memory, a data compression code eliminates trailing spaces.

Like the firm's Delta 4000 microprogrammed video display terminal, the 4300E offers a 128 upper/lower case character set scroll up or down, full tab/clear control, end of data tab and protected text (format) control. Communications speeds up to 9,600 bit/sec are possible with the unit and a serial printer port for hard copy records is also available as an option.

Display Modes

Four display modes — normal, reverse, blink and reverse with blink — aid text processing jobs by calling attention to specific information on the screen, DDS said.

Used with a printer, the terminal can be used to prepare documents at insurance companies and financial institutions, research organizations and government agencies of all kinds.

The terminal displays 25 lines of 80 characters each. An exclusive paging feature displays all the characters in memory — regardless of the number of lines — in any format, without computer memory or regard to the number of lines of information transmitted, DDS claimed from Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

WUI to Start Serving Japan

NEW YORK — Western Union International, Inc. (WUI), a unit of WUI, Inc., and Kokusai Denshin Denwa Co., Ltd. (KDD), the international telecommunications entity of Japan, have agreed to begin operations for private line and other services. WUI will apply to the Federal Communications Commission soon for the necessary authority, a spokesman said.

Japan was the only major country not served directly by WUI. KDD provides all international telecommunications services, telephone and record, between Japan and the rest of the world.

KDD and WUI will offer private leased-channel services to commercial and government users via both cable and satellite.

Private leased channels constitute WUI's second largest service area, next to Telex, which is not covered by WUI's agreement with KDD. KDD and WUI are also currently exchanging views on a future data transmission service between Japan and the United States, WUI said.

OCR SAVES MONEY

How Westinghouse
Saves Over $10,000
A Month With OCR

Westinghouse Credit Corporation's business is financing at both retail and wholesale customer levels. Before OCR, credit applications for computer input were keyed from forms manually generated at a multitude of field offices.

Westinghouse's George Jordan was instrumental in replacing this costly and cumbersome keypunch operation with an Optical Business Machines Laser OCR-One optical character recognition system and seven newly designed forms. About 25,000-30,000 of these forms are scanned every month. The result . . . the keypunching staff has been reduced by over 50%. The savings from this alone amount to about $10,000 a month! More than that, Westinghouse Credit has reduced their reporting time by three days and has achieved much better control of their money.

For information on how you can cut data entry costs with the Laser OCR-One system, contact

Billy Graham
Vice President/
Marketing

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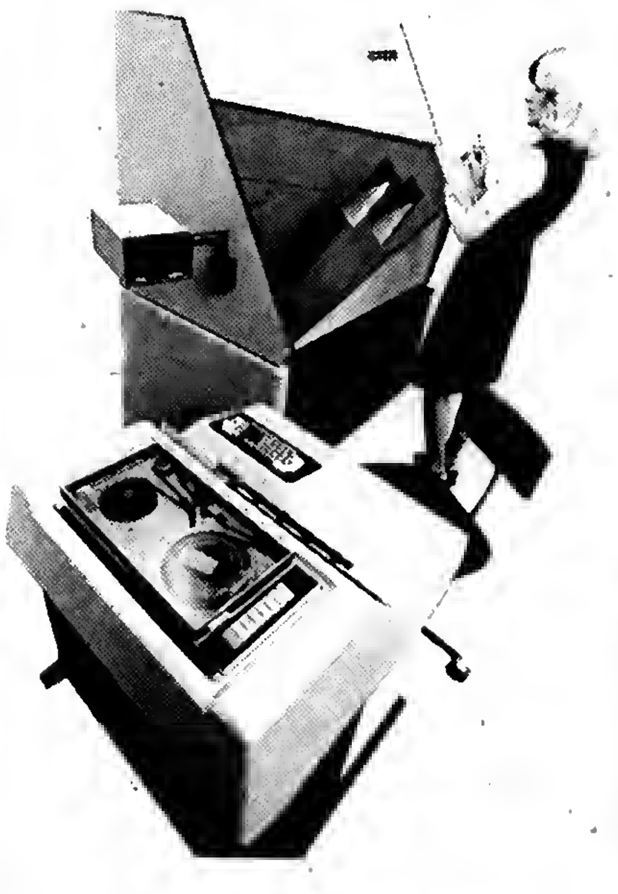

I'd like more Information about the Laser OCR-One

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☐ have a salesman call me

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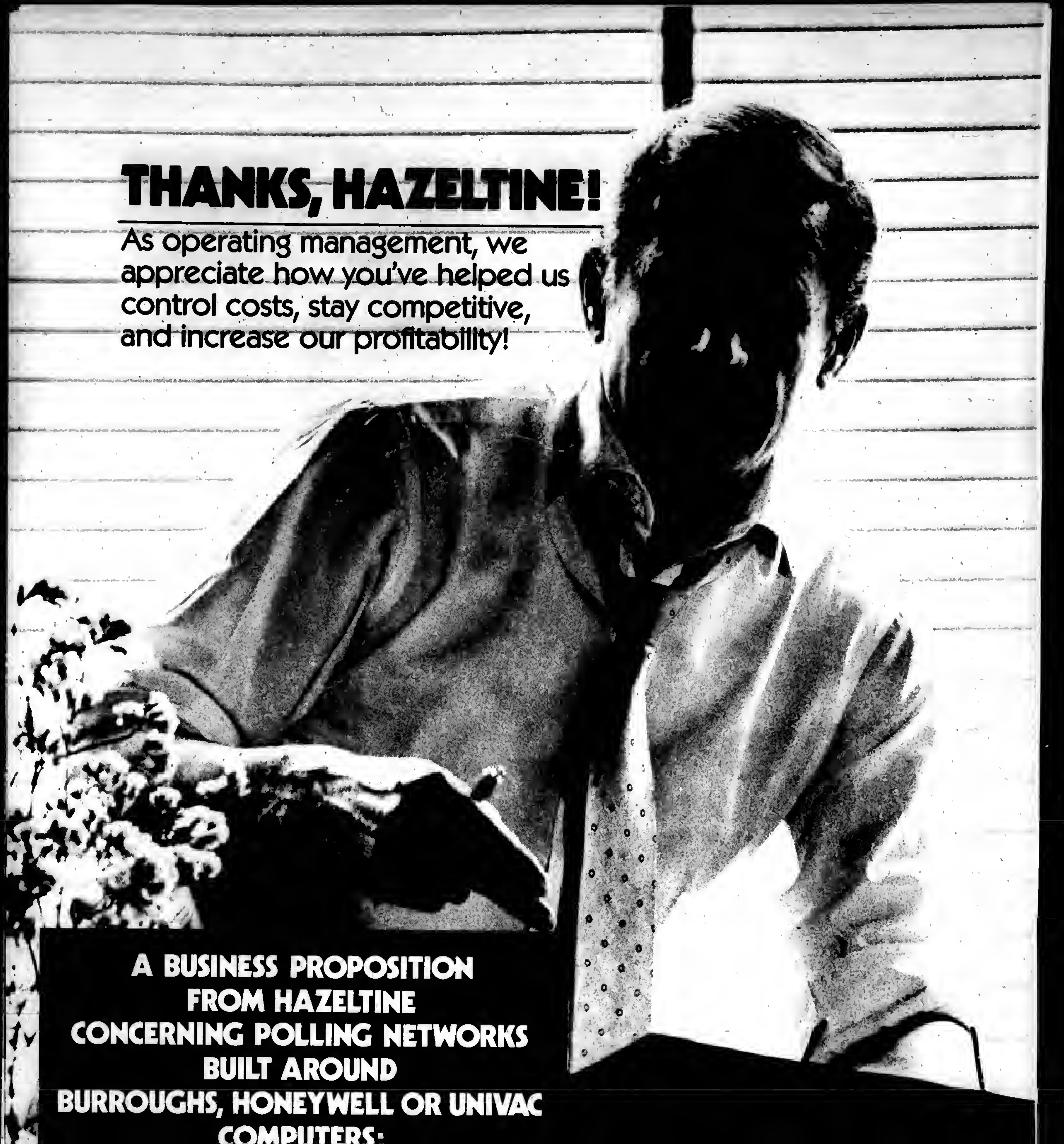

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Helps Assure Data Security

Bank's Film Stops Developing Problem

HALIFAX, Nova Scotia — The Bank of Nova Scotia, headquartered here has found an inexpensive solution to a potentially expensive problem — data security.

The problem was that confidential information shown on CRTs at teller stations could be seen by any customer standing in line.

"It wasn't long after our computer terminal was installed at a pilot branch in March 1976 that we realized we had a problem," according to George W. Tompkins, manager of implementation coordination. "I could read your business and you could read mine very easily."

This presented an undesirable situation since it varied with the traditional banking code of maintaining the security of customer records. "Because we were pioneers in this particular program, we had to find out for ourselves that a problem existed," Tompkins explained.

It wasn't the fault of the terminals, IBM 2970s, according to A.D. MacMillan, projects manager for corporate branch operations. "It was simply a case of our having a unique requirement for a product designed for the industry at large. The problem was, made more acute by our approach of using rotating pedestal bases for the terminals, rather than mounting them on the counter facing the teller," he said.

Pedestal-mounted terminals serve two tellers; this arrangement caused some of the data security problem faced by the bank.

"The pedestals are set back from the counter and can be turned from one teller to another. When the unit faced a teller, information displayed on the screen was visible to anyone in line at that window — the person's name, financial data and any messages.

"We began looking for remedies and obtained some quotes, but we had to move quickly. We were scheduled to have 440 of our 966 branches on the system by mid-1977 and couldn't afford to have that unsatisfactory situation cropping up in branch after branch.

"Meanwhile," he added, "our instruction to the branches was 'Do not turn the terminals' — a restriction that proved awkward at times, but we had no choice."

The problem was solved at a cost of less than $3 per terminal with sheets of light control film from the 3M Co. The film, a thin plastic sheet incorporating microlouvers, works like a tiny venetian blind to reduce glare, control light, improve contrast and control the viewing angle.

When placed in front of a lighted display, it directs light into a controlled viewing pattern and blocks out light from external ambient sources.

Film louvered at 0° restricts visibility to direct frontal viewing. Film louvered at 45° is used in certain branches where a cashier/teller system is employed; in those locations, terminals face the customer directly, but the angle of the louvers con-

(Continued on Page 56)

Savings & Loan Goes In-House After 10 Years With Services

Special to CW

NASHVILLE, Tenn. — After relying on computer service companies for 10 years, the Fidelity Federal Savings and Loan Association here recently opted for in-house DP. The move was prompted by a desire to save money and increase management's flexibility and responsiveness to a changing financial environment, according to Garnett Cothern, vice-president for computer operation.

"Just a few years ago we determined that we couldn't justify the cost of operating our own computer," he said. "Now it would cost us more to utilize an outside service.

"Furthermore, we have more flexibility, and we can prepare for electronic funds transfer, NOW accounts, variable rate mortgages and other likely trends — at our own pace," he added.

Fidelity has 10 branches supplementing the services offered at its 12-story main office in downtown Nashville. The branches extend Fidelity's service to a four-county area in mid-Tennessee. Another two branches are scheduled to open soon.

Based on his experience, Cothern believes associations smaller than one-third Fidelity's size may now find in-house operations financially attractive.

"Computer systems continue reductions in costs," he explained. "Savings and loans that couldn't afford their own DP systems a few years ago can now save money by going in-house.

"Unfortunately, many associations stay with service companies simply because their cost assessment is based upon outdated information," he pointed out. "It's not that

(Continued on Page 52)

0
1
2
3
4
7
CHECK(S)
OUT OF STATE
CHECK(S)
OUT OF TOWN
A display panel on the teller terminal provides the teller with step-by-step instructions for each transaction.

Bits & Pieces

Cleveland Society Sets Measurement Workshop

CLEVELAND — The Cleveland Engineering Society will hold a two-day workshop on computer measurement here Sept. 29-30.

The workshop, which will be directed by Donald C. Harder and David S. Hubbert, is designed for computer management personnel and capacity planning analysts.

The cost of the workshop is $335, which includes luncheons, coffee breaks and all materials. Additional registrants from the same firm will be charged $300; a 10% discount is available for teams of three or more persons from the same firm.

Registration information is available from the society's Education Office, which can be reached by telephone at (216) 361-3100. The society is at 3100 Chester Ave., Cleveland, Ohio 44114.

Brush Removes Static Charges

HILLSDALE, N.J. — The Texwipe Co. has introduced a static eliminator brush that reportedly eliminates the static charges that build up as a result of the movement of paper in hard-copy output devices.

The brush is a conduction-type device that collects static charges and "bleeds them to ground." The brush requires no chemical renewal and maintenance is nonexistent, according to the company.

The brush costs $27 from the firm in Hillsdale, N.J. 07642.

Pericomp Hikes Crimper Price

NATICK, Mass. — Pericomp Corp. has increased the price of its magnetic tape crimper from $28 to $30.

The price hike is a result of increased production costs, a spokesman said from 14 Huron Drive, Natick, Mass. 01760.

In-House DP Gives Savings & Loan Flexibility

(Continued from Page 51)

managers haven't been doing their jobs, but rapid changes have made it difficult for them to keep up-to-date."

Fidelity began planning its conversion in mid-1975. In April 1976, equipment installation was completed and the association began running parallel for its savings operation.

In less then three weeks, it was able to balance to the penny and close out the old savings system. Loans were converted as of June 30, 1976, and both applications are functioning "admirably," Cothern said.

Fidelity is leasing an NCR Corp. Century 151 computer with 128K bytes of memory and four spindles of disk storage; an NCR 640 printer for producing reports and other printouts; and an accessory tape drive. Each 657 disk has a capacity of 50 million bytes.

The association purchased all other system hardware, including two NCR 796-301 CRT terminals (with printer attachments) for file maintenance and inquiry and 19 NCR 270 electronic teller terminals for its main office and branch offices. Fidelity also utilizes NCR's software package for the savings and loan industry.

This combination of equipment and software provides Fidelity with a variety of capabilities not previously available, including on-line access to account histories and the opportunity to automatically calculate penalties on certificates of deposit.

The ability to produce special statistical reports for management is another significant benefit. Automatic generation of an auditor's report, covering all "unusual" transactions, such as those requiring officer approval, is one example of enhanced security; the chance to word customer communications as it wishes is another, Cothern said.

Time-saving features of the system are important, too. Using the terminals, which have the ability to write on tape, it is possible to store off-line transactions to be input automatically. The need to reenter data can be eliminated, reducing the chance for error. The upgraded equipment, especially the teller terminals, speeds customer service and simplifies new employee training, Cothern said.

"I'm not criticizing computer service companies," he added, "But the packages they develop for groups of savings and loan users must have inherent limitations. Consider, for example, delinquent loan notices.

"If a service company has several different associations, it can't possibly individualize the notice wording for each customer. Just changing paper in the printer would present a problem.

"Can you imagine the uproar if the wrong notice were used and a 'get tough' message went out to the customers of an association which had a more lenient approach?"

Concern With Money

In deciding upon its system design, Fidelity was very concerned with teller terminals, upward compatibility, the availability of software and, of course, money.

"Many terminals we looked at require more powerful equipment to drive them," Cothern recalled. "We felt the NCR Century offered us the power we needed to drive the terminals at an economical cost. We can also upgrade to a more powerful century computer without having to change language or software."

"Accessories can be added for electronic funds transfer and automatic teller services without scrapping our existing terminals," he noted.

The cost of software development ruled out some systems which Fidelity considered.

Further, Cothern finds it "reassuring to know that Fidelity will have access to new software modules as they are developed." Share loans, statement savings and construction loans are examples of software needs on the horizon, he said.

Fidelity's teller terminals feature a keyboard with a CRT that provides step-by-step instructions for handling each type of transaction. The backlit instruction panel assures that no steps are overlooked — even when a teller is handling unusual transactions. New tellers do not have to memorize complicated procedures, Cothern explained.

Another feature of the terminals is their ability to record on cassettes. "If the system's down, a teller must enter the information in some way to record the transaction in the customer's passbook," Cothern said. "Since the terminal has the ability to write entries onto a tape cassette, this information can be stored off-line for convenient data reentry.

"This capability can be particularly valuable for mailroom tellers who receive, batch, prove and balance about 80% of all loan payments and a large number of savings deposits. Though they don't need to immediately enter information for a customer, they must pace their work to keep up with the volume. It's a real advantage for them to be able to store information off-line," he said.

Automatic calculation of penalties on certificates of deposit is a benefit much closer at hand. To determine the penalty on an early withdrawal from a time deposit, a manager or teller has to determine the number of days the money has been on deposit, then adjust earnings back to the passbook rate. Fidelity has been using charts in its penalty procedure.

If the money has been on deposit for two years, it takes several minutes to figure, while the customer is kept waiting. When using this feature, Fidelity will be able to calculate penalties automatically. The teller will also be able to make an inquiry and tell the customer the penalty amount before processing.

In the future, on-line history and an alpha locator, or CIF file, will give Fidelity immediate access to every account a customer has with the association, using name or account numbers.

This information is currently kept on microfiche; to use fiche, however, the teller has to leave his station or turn his back on the customer. With the information on-line, it will be easier and more convenient.

Each terminal is designed to allow operation on a different key by up to four tellers. That is an important feature in the small branch offices where secretaries, branch managers, and part-time help may relieve regular tellers during vacations, lunches and breaks, according to Cothern.

With the terminal, some transactions aren't completed without supervisor override. For example, a teller can't make a withdrawal without a passbook unless a supervisor key is used to "unlock" the terminal. Every transaction for which the key is needed automatically appears on an auditor's report.

Future requirements played a large role in Fidelity's selection of the teller terminals. The future and a trend toward a paperless society also was a key in Fidelity's decision to include a tape drive unit in its system.

"Our requirements are going to change dramatically in the coming years," he concluded. "By going in-house, we have gained the flexibility we will need."

1401
payroll blues?

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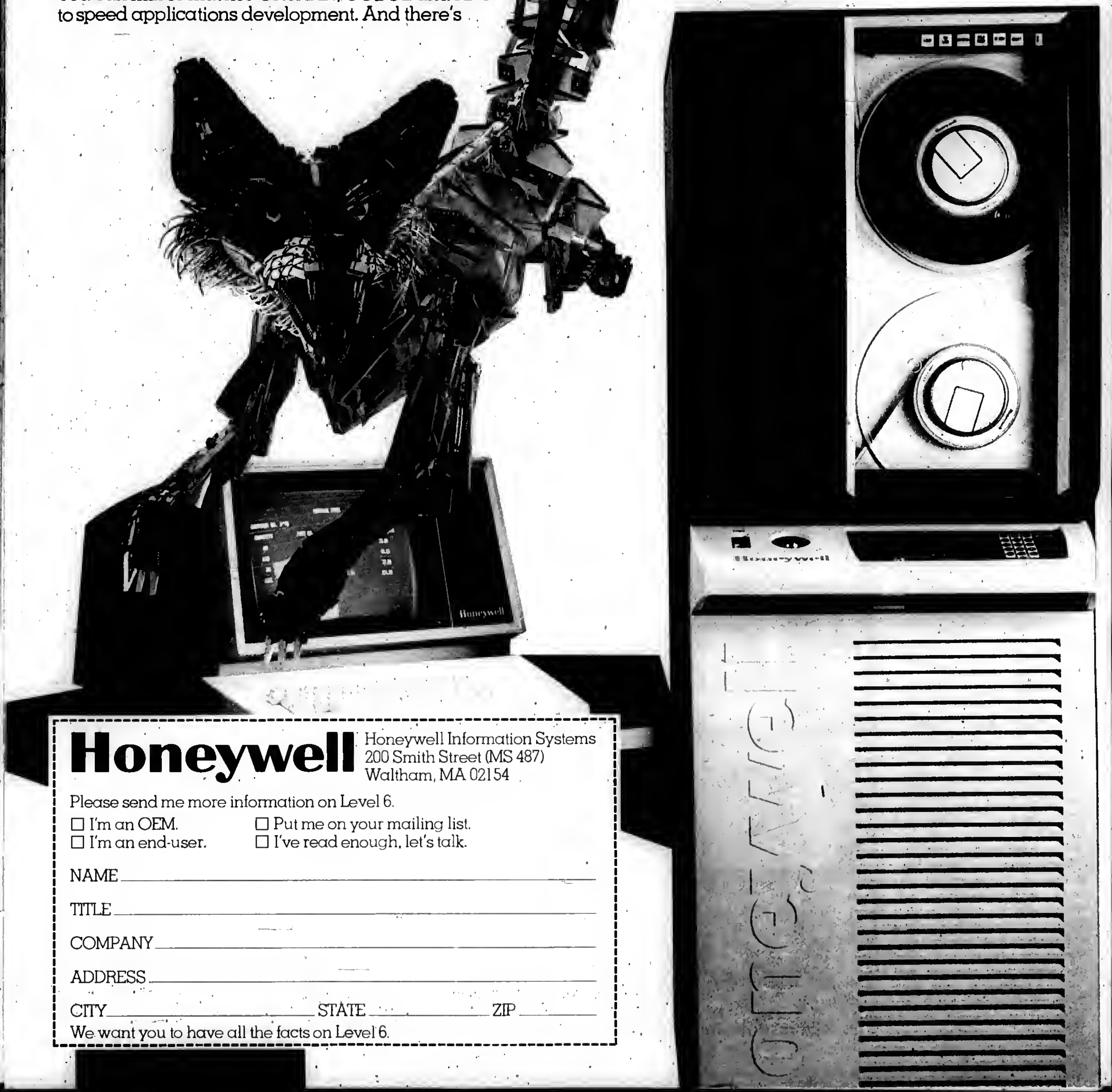

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Report Eyes Contract Provisions

WINTER PARK, Fla. — A report outlining important user-oriented contractual provisions for an era of price cutting and new equipment introductions has been made available by International Computer Negotiations, Inc. (ICN).

These provisions are featured in ICN's *Computer Negotiations Report (CNReport)*, Issue 2.

In line with the latest round of hardware price cuts and new system introductions which have generated considerably interest in recent months, *CNReport*, Issue 2 deals with the numerous contractual provisions that are critical to the user in a price-cutting environment.

Four major contractual considerations are covered in the report:

- Guaranteeing the price — how to ensure that your organization will enjoy the benefit of any price reduction announced after you've signed the contract.
- Substitute or upgraded equipment — how to protect yourself (via the contract) from instant obsolescence.
- Cancellation of the order — how to get out if the price goes up or down or if new state-of-the-art equipment is announced.
- Residual guarantees — provisions to use to guarantee the future value of your system.

The report is available for $18 from International Computer Negotiations, Inc., 400 New York Ave., Box 364, Winter Park, Fla. 32790.

T/S System Drives Debut

SUNNYVALE, Calif. — Basic Timesharing, Inc. has introduced a disk drive and tape cartridge drive for its Model 4000 series interactive time-sharing systems.

The Model 4460 disk drive provides 10M bytes of non-removable formatted storage and replaces the 7.5M-byte drive previously incorporated in the 4000/15 system, according to a spokesman.

The Model 4560 magnetic tape cartridge drive provides 10M bytes of storage using 6,400 bit/in. recording density.

The drives are included as standard equipment on the 4000/15 system at no additional cost. A dual-drive version of the tape drive is included along with a disk drive in the 4000/25 system at no additional cost, the spokesman said from 870 W. Maude Ave., Sunnyvale, Calif. 94086.

Card Reader Has Buffer

MELBOURNE, Fla. — Documation, Inc. has introduced a fully buffered card reader that reportedly appears as an IBM 2501 reader to IBM 360 or 370 CPUs.

The 1,000 card/min reader, the DOC 6501, is unlike the 2501 in that it is fully buffered and can be installed as a low-priority device on any position on the channel, a spokesman claimed.

The unit has a "pick and riffle" vacuum air system that the firm claims will virtually eliminate the normal card edge damage found in mechanical feed mechanisms. The unit also features data resynchronizing logic which reportedly provides accurate reading of cards with punching misregistered by more than 50% over the industry standard, the spokesman said.

The unit sells for $14,000 from the firm at P.O. Box 1240, Melbourne, Fla. 32901.

Firm Adds Two Printer Systems

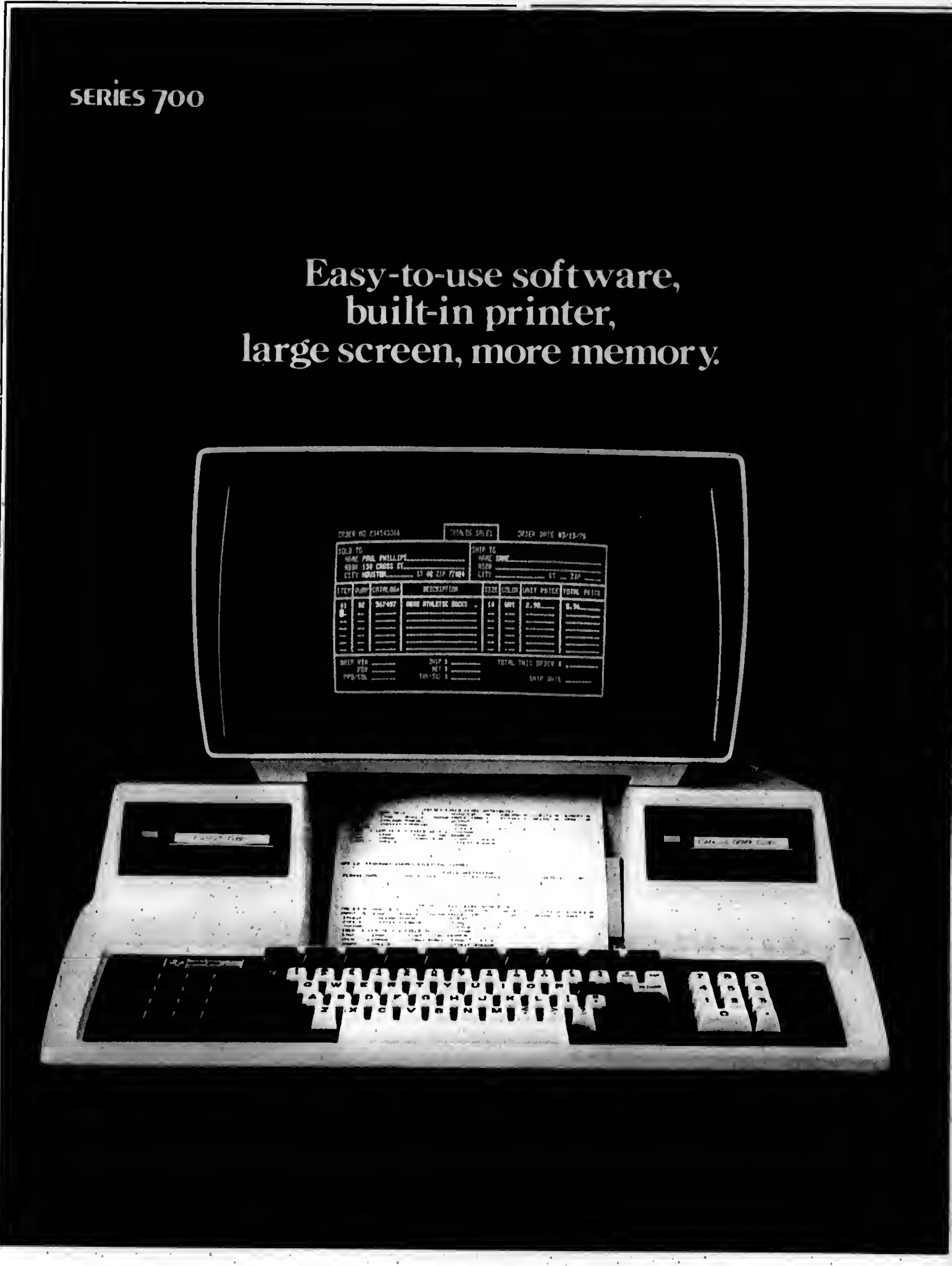
MELBOURNE, Fla. — Documation, Inc. has expanded its family of line printer subsystems with the introduction of both a 1,250 line/min and a 1,500 line/min printer.

The DOC 1250 and DOC 1500 are microprocessor-controlled, fully buffered, 132-char. systems that are IBM 1403 plug-compatible.

Standard features include six-part form printing, interchangeable print bands, a forms control buffer, vertical line spacing of either 6 or 8 line/in. and a 75 in./sec slew rate, the spokesman said.

An integrated controller communicates through the interface to the host CPU, decodes all commands, controls printer hardware and reports both errors and status, the spokesman explained.

The DOC 1250 costs $45,000 and the DOC 1500 sells for $50,000 from the firm at P.O. Box 1240, Melbourne, Fla. 32901.



Programmable Device Records Transaction Data

PENNSAUKEN, N.J. – The Danyl Corp. here has introduced a microprocessor-controlled transaction recorder. The unit was designed for a variety of data acquisition and data logging applications, the firm said.

System 80, which features a cassette recorder and an 8080-based microprocessor controller, allows the installation of a 17-char. badge reader and 32-key calculator-style keyboard as optional input devices, according to a spokesman.

The use of the microprocessor-based controller allows the System 80 to be programmed and tailored for specific data entry and acquisition requirements.

Input data may be checked for validity and analog data may be compared to go/no-go thresholds or may be averaged over time, the spokesman explained.

All transaction information may be recorded on tape for subsequent processing and the tape capacity exceeds 125,000 bytes, he said.

The system may be purchased without firmware for user programming and Danyl will provide programming and external interfaces per user specifications. The recorder accommodates up to 1.5K bytes of read-only memory and 256 bytes of random-access memory, the spokesman said.

System 80 costs $1,250 and delivery is 60 days from the firm at N. Park Drive and Browning Road, Pennsauken, N.J. 08109.

Free Catalogs Offered

The following brochures and catalogs are available free of charge from vendors:

CW Industries, Inc. has a 12-page catalog describing the company's Cee Wee connectors for flat flexible cable with round connectors. The firm can be reached at P.O. Box 96, Warminster, Pa. 18974.

A 24-page full-color brochure covering Versatec Co.'s line of printers and plotters is available from the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.

A one-sheet catalog of capabilities describing the sonic digitizers, data converters, interfaces and accessories produced by Science Accessories Corp. is available from the firm at 970 Kings Highway West, Southport, Conn. 06490.

Literature describing the processing of payments by transaction at high speed is available from Cummins-Allison Corp., Data Systems Division, 800 Waukegan Road, Glenview, Ill. 60025.

A brochure covering Tenny Engineering, Inc.'s digital instrumentation options is offered by the firm at 1090G Springfield Road, Union, N.J. 07083.

A technical bulletin from Mavilor Motors describes the firm's line of .25-through 13-horsepower DC motors. The firm is at 285 Murphy Road, Hartford, Conn. 06114.

Breadboards

A 32-page catalog describing over 100 different breadboards for use by prototyping engineers is available from Douglas Electronics, 718 Marina Blvd., San Leandro, Calif. 94577..

A 12-page brochure that provides a graphic presentation of the metal cabinetry capability of Electronic Enclosures, Inc. is available from the firm at 225 S. Aviation Blvd., El Segundo, Calif. 90245.

A 14-page, four-color brochure by Datel Systems, Inc. describes its 40-column alphanumeric impact printer. The firm is at 1020 Turnpike St., Canton, Mass. 02021.

Network Systems Corp. is offering six application data sheets featuring Hyperchannel, a product for multiple computer interconnects. The firm is at 6820 Shingle Creek Pkwy., Brooklyn Center, Minn. 55430.

An illustrated 8-page bulletin explains in management terms the problems and solutions encountered with computer systems involving power deviation, brownouts and blackouts. It is available from Cybernex, Inc., 7171 Industrial Park Blvd., Mentor, Ohio 44060.

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Model 810 Impact Printer

Easy-to-use software, easy-to-learn language.
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And, of course, TI offers total service and support, including flexible maintenance plans and a nationwide network of factory-trained customer service engineers. For your distributed processing needs, TI clearly has a better solution. For more information, mail back the coupon. Or call your nearest TI sales office or Terminal Systems Marketing, (512) 258-7176.

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TEXAS INSTRUMENTS
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Inforex Hikes Disk Capacity of System 5000

BURLINGTON, Mass. — Infurex, Inc. has reportedly quadrupled the disk storage capacity uf its System 5000 file management system with the introduction of two dual-density disk storage units.

The Inforex offerings are the 62.1M-byte Mudel 5303 and the 236.1M-byte Model 5304. Up to four drives of either density can be attached tu each System 5000 cuntrul unit, pruviding a maximum capacity of 944M bytes rather than the previous limit uf 200M bytes, according to a spokesman.

The Model 5303 featues 256 byte/-sector, 59 sector/track and 5 track/cylinder. Each pack contains 823 cylinders and five platters. All five platters can be multitrack searched, he said.

The units have a rotational speed of 16.67 msec with 8.33 sec uf latency; the unit achieves 3,600 rev/min, he added.

The drive supports 4,040 tracks/-pack on the initial drive and hosts up to four drives, allowing a total of 16,385 maximum usable tracks.

Extra Drives Optional

A 5303 drive with contruller sells for $40,000. A controller can handle four drives and an additional drive sells for $27,000. Munthly rentals on the drive and controller range from $960- to $1,370/mo. Rentals on the additional drive range from $630 - to $830/mo.

The Model 5304 drive features 256 byte/sector, 59 sector/track and 19 track/cylinder. Each pack contains 823 cylinders and 10 platters.

Eight uf the platters can be multitrack searched. Rotational speed, latency and rev/min rates are the same as those of the 5303.

The drive supports 15,562 track/pack un the initial drive and hosts up to four drives, allowing a total of 62,473 usable tracks, the spokesman said.

The 5304 with controller sells for $80,000 and a second drive sells for $42,000. Monthly rentals range from $1,835- to $2,160/mo for a single-drive unit to $940- to $1,230/mo for the second drive.

Infurex is at 21 North Ave., Burlington, Mass. 01830.

IBM Microfilmer Enhances Deposit Processing System

WHITE PLAINS, N.Y. — IBM Corp. has introduced a microfilm recorder that gives banks a sequenced tally of checks and deposit slips that have been processed by the firm's 3895 deposit processing system.

The unit records documents as they move through the 3895 reader/-inscriber, making pictures of one or both sides of each document, a spokesman explained. The unit can record more than 100,000 items daily, he said.

Eight-digit index numbers are printed on the microfilm next to document images for retrieval of specific items. The numbers match those the 3895 prints on the face of each item, permitting stored documents to be matched with the film record, the spokesman said.

Additional item-tracking capability is provided by frame marks exposed along the film edge.

The recorder, which can be field-installed, fits into a 4-ft wide section of the 3895. The accessory film cassette can store approximately 380,000 front and back images on 2,000 linear ft of microfilm, the spokesman noted.

Software Support

The on-line microfilming feature will be supported by application software, the Check Processing Control System-Deposit Processing Feature and by Deposit Processing-Operating System/Virtual Storage (OS/VS).

The monthly lease charge for the feature is $2,725; monthly use charge is 1.9 cents per 100 item passes. Purchase price is $100,000 and the price of the film cassette is $424.

First shipments will be scheduled for November 1978, the spokesman said from 1133 Westchester Ave., White Plains, N.Y. 10604.

Film Puts Stop To Data Problem

(Continued from Page 51)

trols the distance from which the information can be seen. Someone six feet away, for example, sees only a blank screen.

The screens are now in place in 440 branches, and the bank expects to have more than 900 branches on the system equipped with the light control film by 1980, Tompkins noted.

More Than a Service

Maintaining the confidentiality of customer records is more than a service, it's a basic principle of banking, he said. "Fortunately, we were able to correct a potenitally damaging situation before it went too far. Had we done nothing at the time and looked the other way, I'm certain there'd be action by now in many quarters.

"The potential ramifications of doing nothing far outweigh what it has cost us," he added.

It took less than five minutes to install the sheets of film and conversion has posed no problems, except for the occasional human error, Tompkins said.

"When we started the test, one of the employees in the corporate data center indicated that nothing could be read through the new film," he recalled. "The employee said that the screens were not at all what was ordered and they didn't work.

"I told the employee to bring them over and we'd take a look at them here. They worked fine. They had been installed upside down."

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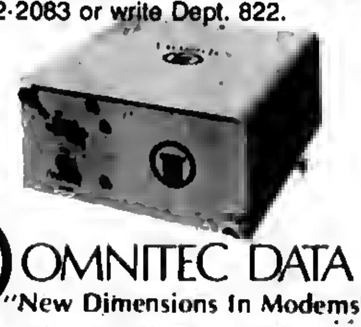

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Survey Shows Users Happy With Minis

By Esther Surden
CW Staff

Most minicomputer users who responded to CW's recent survey were very pleased with their small systems despite problems with software support [CW, Aug. 29].

Those who responded were dedicated to using the small systems. For example, when asked what their firms will do when they outgrow their present mini, most users said the companies will either get a larger mini or off-load the small system with another small system. Few believed they will ever outgrow their present system.

Adding memory, disks or terminals to the present system was a growth alternative often cited. Only a few users said they would grow into a mainframe when their processing needs become too complex for their present mini.

Outgrowing the system "is not forseeable at the present time," one user told CW, while another said "it cannot happen."

Upgrade Capability

System upgradability was a topic touched upon often by users explaining why they switched from one system to another or why they liked their particular mini.

One company that was happy with its Hewlett-Packard 2100 system converted to a Prime Computer, Inc. 400 minicomputer. "The reason we did not stay with HP is that it is not easy to upgrade in small steps. With Prime, we can gradually upgrade as (and how) we need it with no software modifications," the DP manager said.

Another user, explaining why his company will get another supermini if it ever outgrows the one it owns, said: "Two superminis are better than one large mainframe. Also [this] helps cash flow [because] you buy it when/-as you become ready."

The price/performance benefits of minis were touted by many users. "Transaction-oriented minis are great. They give users control of their systems and the price/performance is outstanding," in the opinion of one systems manager.

A Los Angeles company using Digital Equipment Corp., Qantel Corp., Data General Corp. and IBM minis said, "generally, price/performance ratio and type of applications are superior for minis."

Minis bring processing power closer to the user, several respondees pointed out. "The trend toward minis will continue as large systems remain unmanageably complex," a user of a mainframe who also copes with 50 minis predicted. "Using a mini allows local users access to data and fast turnaround," a DP manager said.

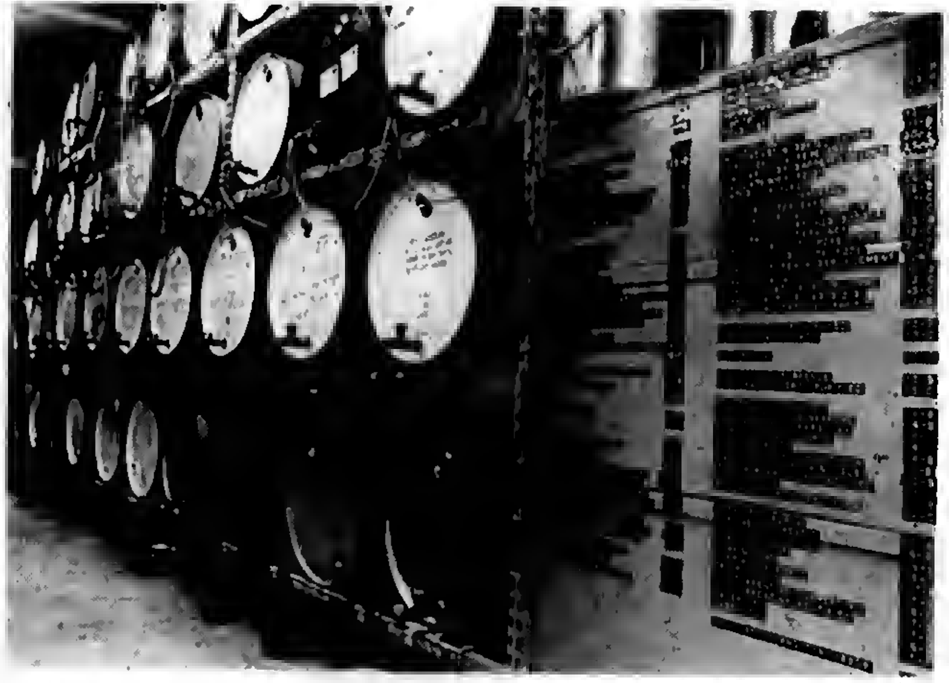
System Sniffs Out Savings

By Esther Surden
CW Staff

NEW YORK — "Our inventory made up our largest investment, so we thought we'd better go after our bread and butter application first," William Bulger, treasurer of Fritzsche, Dodge and Olcott, Inc., said.

The firm's system has been credited with cutting response to inventory inquiries from three days to 10 seconds and reducing the disparity between physical inventory and recorded inventory from 7% to 1%.

The firm is using an IBM 3/15 small business system to keep track of more than 4,000 off-the-shelf products, 3,000 special orders and more than 180,000 formulas for the flavors, fragrances and oils it produces.



Inventory system at Fritzsche Dodge and Olcott, Inc. copes with materials for 180,000 flavor and fragrance formulas.

Prior to the company's first move to a computer, an IBM 1401, the inventory was kept on receiving and withdrawal slips for each product and each lot of the product. The slips were kept in a file cabinet clipped to "long skinny plates."' When a withdrawal was made from a particular product supply and lot, a withdrawal slip was added to the file and the balance left was forwarded, Bulger said.

Files Unwieldly

The business grew to the point where the file cabinet became a cumbersome way to do business. In addition, "the company's needs were getting more sophisticated" and government regulations more complicated.

"If the Federal Drug Administration, for example, banned certain chemicals, we would have to find which products in the line used those chemicals in order to revise the formulas" or else withdraw the product, he continued.

The 1401 performed the inventory application using cards "but it was still too slow." Teletypes at the company's remote locations in New Jersey transmitted inventory data daily, so the records at company headquarters were only behind by a day and a half, rather than three days.

Anticipating a move to an on-line system, the firm then installed an IBM 360 which emulated the 1401, because it was "easier to go from a 360 to a 3," Bulger said. This allowed the company to keep in business while the programs were being changed to on-line status.

The present IBM 3/15 is attached to six remote terminals in the firm's manufacturing facilities. The terminals are directly on-line to the 3/15 and data is entered at the remote locations. The firm recently installed two additional terminals for inventory and stock maintenance.

"When we used to take physical inventory we were happy with a 7% or less disparity between our figures and inventory. With this system, there is less than a 1% difference," he said.

Using Effectiveness Grid — Part 1

Method Aids Firms Nearing DDP

By Carl Masi
Special to CW

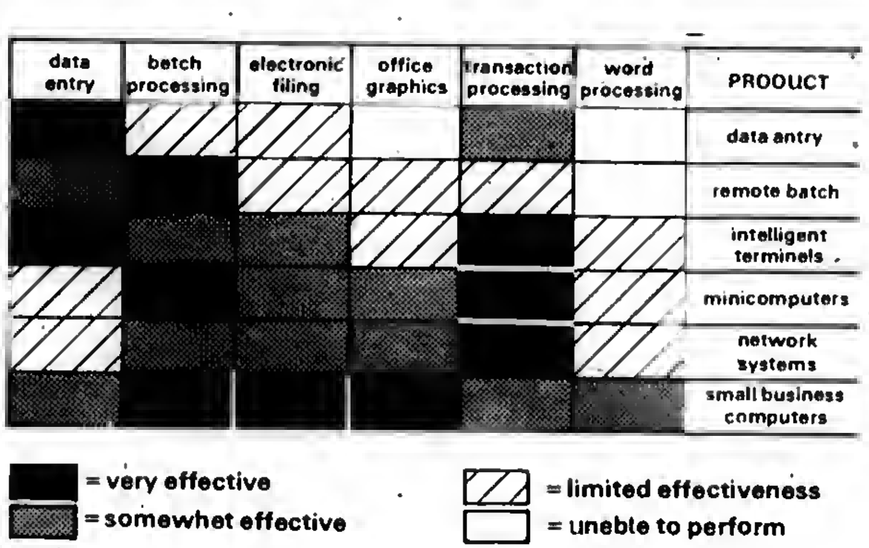
We recommend that users evaluate their needs in selecting small systems for distributed processing based upon an analysis of what we call an effectiveness grid. In fact, the larger and more diversified the company, the more important this effectiveness grid becomes.

The purpose of the grid is straightforward. It is designed to help a user measure the utility (of a product) to his organizatin vs. the commitments and risks it faces (by choosing a particular piece of equipment).

This is the first part of a two-part series on using an effectiveness grid to determine distributed systems requirements. The second part will cover organizational enrichment, policy impact and measuring productivity of such a system.

There are six relevant issues not usually considered by users in their development of dispersed information systems.

First, we have the issue of functional range: the extent to which a single product or product type can fulfill all of the most commonly needed functions in the departments, offices and other locations that the user might wish to incorporate in a distributed network.



data entry	batch processing	electronic filing	office graphics	transaction processing	word processing	PRODUCT
■	▨	▨	□	▒	□	data entry
▒	■	▨	▨	▨	□	remote batch
■	▒	▒	▨	■	▨	intelligent terminals
▨	■	▒	▒	■	▨	minicomputers
▨	▒	▒	▒	■	▨	network systems
▒	■	■	■	▒	▒	small business computers

■ = very effective
▒ = somewhat effective
▨ = limited effectiveness
□ = unable to perform

An example of a functional range effectiveness grid.

Essentially, data entry, electronic filing, transaction processing, batch processing, office graphics and word processing are all of the functions that one is likely to have occasion to perform in a distributed network, now or in the future.

The available classes of products with which to perform those functions are data entry systems, remote batch terminals, intelligent terminals, minicomputers, networked systems and small business computers.

Any or all of these products can be clustered or stand-alone, on-line or off-line, or available in any one of a number of configurations. What is important to measure is the extent to which each class can perform the maximum number of planned and anticipated functions in the network, not through massive customized development, which is costly to initiate and even more costly to maintain, but as standard off-the-shelf product capability.

The second major issue to be

(Continued on Page 58)

Industrial Process Controller

SANTA CLARA, Calif. — Selanar Corp.'s MC-1 process controller is designed to handle large industrial control and data acquisition projects, the firm said.

The MC-1 was designed to operate in a variety of industrial applications including industrial equipment monitoring, power demand regulation, chemical and petroleum process control and scientific experimentation control.

The UCP operating system aids engineering firms and end users who cannot afford to develop extensive software capabilities, the vendor claimed.

A user enters simple statements and the compiler composes the control programs using appropriate translation for each statement, the firm explained.

The MC-1 controller consists of a 16K-word CPU, 1,920-char. CRT terminal, 30 char./sec matrix printer, IBM-compatible diskette storage system and a 64-channel analog measurement device.

A custom digital I/O interface includes 256 inputs and 128 outputs with a basic scan rate of 10 times per second per channel under program control. The interface also has two serial I/O ports for the CRT and printer. An 8-bit parallel interface is also part of the package.

The package costs $26,000 including on-site setup and test plus software instruction. Selanar is located at 3054 Lawrence Expressway, Santa Clara, Calif. 95051.

Video Unit Fits DG Minis

BURLINGTON, Mass. — The Model 200-D Graphics and Imaging Video Processor from Lexidata Corp. generates raster-scanned, refresh, graphics and imaging displays, according to the firm.

The unit is contained on a 15 in. by 15 in. printed circuit board and fits into "any standard Data General Corp. Nova or Eclipse," the firm noted.

A standard upper case Ascii alphanumeric character generator produces 5 by 7 dot matrix characters which may be superimposed on the image displayed.

Featuring a writable control store, the Model 200-D allows modification of all image-processing and data-formatting routines under program control from the host system, the company said.

Model 200-D costs $4,900 for a basic black and white model and $5,300 for the basic color version, Lexidata said from 215 Middlesex Tnpk., Burlington, Mass, 01830.

Grid Aids DDP Selection

(Continued from Page 57)

faced in terms of distributed processing is transitional ease — the ease with which the user can take the current system and planned new products and integrate them into the dynamics and geography of the business. This integration must be accomplished in six ways — selecting and preparing sites, training the staff, converting and developing software, insuring compatibility with existing systems if needed, implementing procedural changes and ensuring adaptability to both initial and longer term requirements of the business.

Using the grid it becomes clear that some products are much easier to install painlessly than others. Some will require substantial software development and conversion. Others, by their nature, have limited future growth potential. And some will require heavy training commitments.

To many users, one or more of these limitations may be unimportant, since they are planning major changes for which training or conversion efforts should be heavy. But the point of this grid evaluation is to anticipate and clarify in advance and with precision the extent of such requirements.

The third major issue in distributed processing development is the configurability of the various product classes, both now and in the future. If the organization is changing constantly, the requirement for equipment to keep up with that change is of paramount importance.

System Expandability

Therefore, when we talk of configurability, we are talking about the ease with which product classes can be reshaped, when and as needed from single stand-alone devices to small, medium or large clusters; or expanded to become multiprocessing systems, if such is required; or through minor software modification made to perform in concurrent or multiprogramming modes.

Another key aspect of configuring a network of small systems is mobility, the ease with which Product A, no longer needed in Location B, can be packed up and moved to Site C.

Peripherals Important

So also is the peripheral equipment complement important. The 15 char./sec printer in use today at a specific site will probably have to grow to 45 char./sec or 60 line/min before long. It may have to have some disk storage as well. Thus it is very important to rate product classes on their effectiveness in terms of configurability.

This article was excerpted from a speech delivered by Masi, director of product marketing for Wang Laboratories, Inc., Lowell, Mass., at a recent conference.

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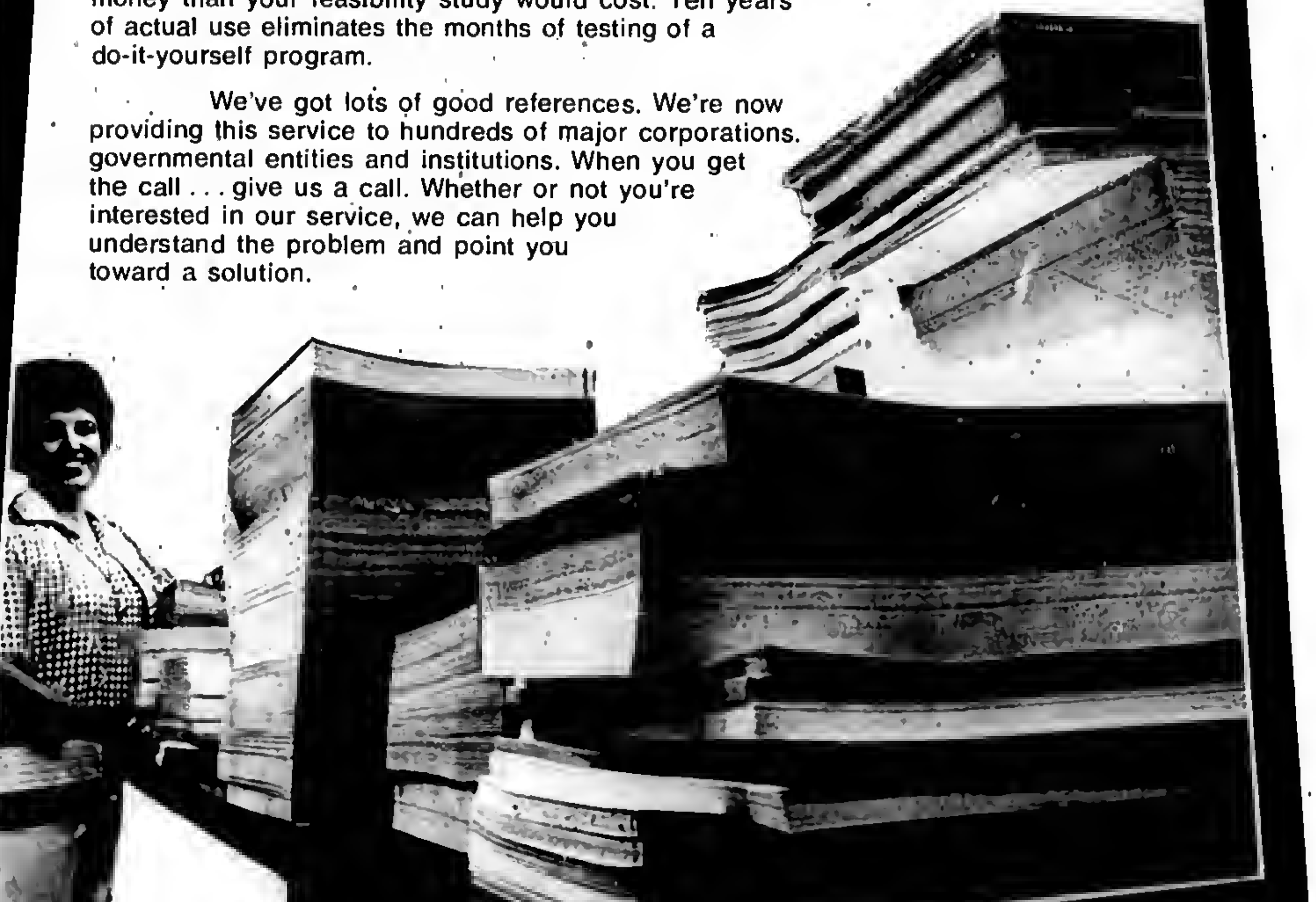

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Dual Minis Offer Process Control

PRINCETON, N.J. — A minicomputer-based process control system that uses dual Modular Computer Systems, Inc. 32-bit CPUs is available from Metromation, Inc.

The system was designed to "meet information and control requirements for large refineries, gas pipeline systems and petrochemical plant complexes," Metromation said. Typical applications include data gathering, monitoring of utility services and control of unit operations, it added.

The CPUs share data loads by "functional splitting" rather than having a redundant CPU on stand-by, a spokeswoman explained. The first CPU handles real-time functions while the second handles interactive/batch operations.

Either CPU can take over the operations by dual addressing of key peripherals, redundant data recording techniques and inter-CPU communications techniques, the firm noted.

Prices for the system range from $500,000 to $2 million and are dependent on the individual user's requirements, the spokeswoman stated. The company can be reached at 1100 State Road, Princeton, N.J. 08540.

Memory Replaces DEC Disk

ENGLEWOOD, Colo. — A solid-state replacement memory unit for the Digital Equipment Corp. RF/RS-11 fixed-head disk is available from Monolithic Systems Corp.

Dubbed the Extended Memory Unit, (EMU), the device features an access time of 2.1 microsec, required to set up control registers and initiate the transfer of information to and from the main memory, Monolithic said.

The unit can be used in DEC PDP-11/04 to 11/70 systems.

Using interchangeable memory modules, the unit features a dual-port Unibus interface, the vendor said.

The EMU costs $23,795 for one million bytes. Monolithic is located at 14 Inverness Drive East, Englewood, Colo. 80110.

Micro Debuts

LA JOLLA, Calif. — The Micro-740 from Micro Business Applications, Inc. is a small business system based on a microcomputer.

The basic system, configured around an Intel 8020 microprocessor, includes 58K bytes of user-accessible memory; one CRT; a 6M-byte fixed platter disk drive; cartridge tape drive capable of handling 2.4M- to 11.2M bytes of data depending on how it is formatted; a 125 line/min printer.

The basic system, available next month, will cost $24,750. The Fortran compiler will cost $1,000. The company can be reached through P.O. Box 2888, La Jolla, Calif. 92038.

Controller Fits Nova, DCC-116

PALISADES PARK, N.J. — A peripheral controller for Data General Corp. Nova 1200 and Digital Computer Controls, Inc. DCC-116 minicomputers that reportedly can replace up to five DG controller boards is available from Computer Data Access, Inc. (CDA).

The Model 6100 controller provides all controllers needed for a small on-line, multiterminal computer system. It can handle up to four California Computer Products, Inc. 140 series floppy disk drives, up to three RS-232 devices and a line printer, the firm noted.

The unit costs $2,200 with quantity discounts available, a spokesman noted from CDA at 470 Commercial Ave., Palisades Park, N.J. 07650.

IDS Introduces Impact Printer

WATERTOWN, Mass. — A tabletop dot matrix impact printer designed for use with minicomputers and microcomputers is available from Integral Data Systems, Inc. (IDS).

The printer operates at up to 120 char./sec and accommodates up to 132 char./line, IDS said. An RS-232 and current-loop serial interface are standard.

Other features include enhanced mode double-width characters, selectable character and line sizes and multiple copy capability on both fanfold and roll paper.

A 5 by 7 dot matrix is used to print the standard 64-character Ascii set, the company noted.

The unit costs $745 from IDS at 5 Bridge St., Watertown, Mass. 02172.

3M Offers Cartridge For HP 7905 Drive

ST. PAUL, Minn. — A front-loading, single-disk cartridge for the Hewlett-Packard Co. 7905 disk cartridge drive is available from 3M Co.

The Scotch Brand 932 disk cartridge features a 200 track/in. track density and a bit density of 4,400 bit/in. It has a capacity of 10M bytes per cartridge, the firm noted.

The disk costs $150 to $160, depending on quantity, from 3M at Department DR7-6, 3M Center, St. Paul, Minn. 55133.

The Printer Store

Digital Associates Corporation

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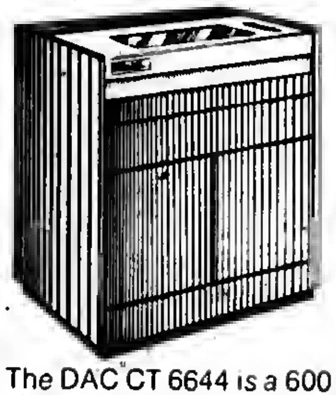
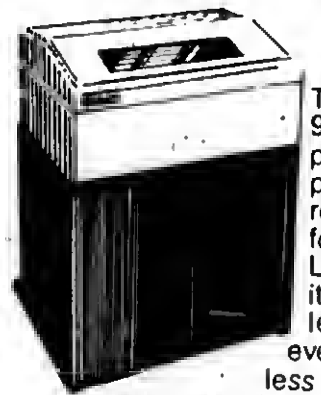


The DAC CT 6644 is a 600 LPM chain-train printer that replaces LP11-YA.
It gives letter-quality printing, and costs about 40% less than DEC's 600 LPM drum printer.
Again it comes with PDP-11 interface, installation and maintenance.

Specification:
Solid-font chain-train printer
600 LPM, 132 column/line
64 character/column
Available in u/l case

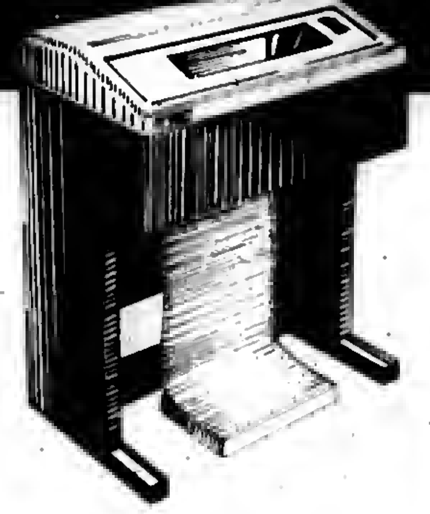
Or, upgrade to a 900 LPM printer for 25% less than you now pay for 600 LPM.



The DAC 2290 900 LPM printer is a plug-to-plug replacement for the LP11-CA. But it costs 30% less. In fact, it even costs 25% less than DEC's 600 LPM printer. Comes with PDP-11 interface, installation and maintenance.

Specification:
Solid-font drum printer
900 LPM, 136 column/line
64 character/column

PDP-11 USERS: Save 40% on your LP11-YA printer costs.



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Specification:
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600 LPM, 136 column/line
64 character/column

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Digital Associates Corporation, 1039 E. Main St., Stamford, CT 06902, Phone (203) 327-9210. Outside CT, Call Toll Free 800-243-9054

PDP-11 Changes Eased

WOODLAND HILLS, Calif. — A device designed to let Digital Equipment Corp. PDP-11 minicomputer users physically and electrically reconfigure their systems is available from Datafusion Corp.

Called the OSR11-A Busrouter, the unit can aid users who, for example, have "too many peripherals for a single CPU, causing the Unibus to be overloaded," a spokesman explained.

The Busrouter can have up to eight switching planes in its housing, the company said. The Unibus plugs into one of the switching planes and comes out as two cables on the other side of the box, a spokesman explained.

Two different sets of peripherals can then be attached to the cables. A user could run for four hours with one set, for example, and then switch to the other set for the rest of the processing.

A number of different configurations can be accommodated involving multiple CPUs, the spokesman added.

A single-plane version of the product costs $995. The systems are delivered configured to the user's particular application with delivery available in "about three weeks," the spokesman continued. Datafusion Corp. is located at 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

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Mini Controls Library Circulation

CINCINNATI — A minicomputer-based book circulation and control system is available from Cincinnati Electronics Corp. here.

Called Classic for Circulation Library Automated System for Inventory Control, the system can be supplied as a complete turnkey unit, a spokesman noted.

The system operates without the need for a trained computer operator, the company stated.

Hardware for the unit includes the CPU, a Univac V77 (formerly from Varian Data Systems) with a minimum of 64K of memory. Also included are a printer ranging in speed from 180 char./sec to 1,200 line/min, a single magnetic tape unit for backup and one disk or multiple disks with up to 600M bytes of storage.

Terminals include a JRL-1000 circulation terminal with a built-in bar code reader and a 45 char./sec receive-only printer.

Supplied with all peripherals, terminals and software, the system ranges in price from $100,000 to $300,000 depending on the library. The system is multiprogrammable so users can run other applications on it, a spokesman noted from the company at 2630 Glendale Milford Road, Cincinnati, Ohio 45241.

Decitek Adds Reader

WORCESTER, Mass. — A paper tape reader that can be configured for desktop or rack mounting with or without fanfold bins is available from Decitek.

The Model 262D9 reads at up to 300 char./sec bidirectionally and synchronously or asynchronously, according to the vendor. Standard features include an RS-232C connection, current loop and parallel I/O interfacing. Transmission rates for the unit are selectable up to 9,600 bit/sec.

Interface characteristics are also selectable by a switch mounted on the rear panel. Additional program functions are internally programmable by jumpers, the company noted.

The unit costs $675. Decitek is located at 250 Chandler St., Worcester, Mass. 01602.

COM Recorder Handles Color

MINNEAPOLIS — A computer output microfilm (COM) graphics-recorder that operates with Digital Equipment Corp.'s PDP-11 family running under RT-11 or RSX-11 is available from Dicomed Corp.

The system was designed to satisfy both black and white and color scientific and business graphics needs, the firm said. It is available in either on-line or off-line system configurations and produces black and white and color vector or raster images on 16mm, 35mm, 70mm and 105mm film

A software package provides for job and recorder control, software character generation, color control and microfiche camera control.

The base price of the D48 is $99,750. Ten optical assemblies ranging from $3,750 to $24,750 are also available.

Off-line systems begin at about $200,000, a spokesman said from the company at 9700 Newton Ave. South, Minneapolis, Minn. 55431.

Stein Has Array Processor

WALTHAM, Mass. — Stein Associates, Inc. has introduced an array processor designed for use as a number cruncher along with minicomputers.

The AR-10 has a multiprocessor design. Subprocessors operate in parallel and are interconnected by the system's bus, which performs direct memory access transfers without cycle stealing.

The unit also features a cross-assembler and linker written in Ansi Fortran, he said.

The unit has an AR/Scan panel that allows operational analysis and program debugging by trapping and displaying data, addresses or other program parameters in any of the subprocessors while the program operates at full speed, the company added.

A single subprocessor configuration costs $28,000 and a three-processor configuration costs $100,000. Stein is at 280 Bear Hill Road, Waltham, Mass. 02154.

Olivetti A-6, A-7 Get Floppy Disk

NEW YORK — Olivetti has enhanced its A-6 and A-7 small business systems with the addition of floppy disk subsystem.

The subsystem, which can also be used with the firm's TC800 terminal, is said to be compatible with IBM 3740 floppy disks.

The floppy unit is made up of an automatic loader, dual read/write floppy disk unit and a power supply.

The unit costs $4,560 from Olivetti at 500 Park Ave., New York, N.Y. 10022.

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'Typical' One a Professional

Hald: Hobbyists Come in Three Varieties

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — Much attention has been given to the hobbyist use, but little has been done to find out exactly who that user is. The hobbyist user can actually be divided into three categories, according to Alan P. Hald.

Hald is in a good position to know about hobbyist users because he is a co-owner of the Phoenix Group, Inc. The Phoenix Group owns the Byte Shops of Arizona, Byte Shop mail order organization and Micro Age, which specializes in wholesale and special retail sales.

The first category is the pure hobbyist, according to Hald. This person wants to build the microcomputer from the bare boards up.

The second and commonest type of hobbyist is interested in a kit-type system that requires a fair degree of time and effort, but has much of the complex assembly already done.

The third category is the casual hobbyist who is interested in either a kit or assembled mainframe and is willing to purchase assembled memory, CRTs and other peripherals.

The typical hobbyist — if there is such a creature — is usually a professional in a field that is oriented toward technology, according to Hald. Another way to describe this person would be as a "forward-looking professional," he said.

It is not uncommon for this person to have a goal of eventually integrating hobby and profession, he noted.

This integration of hobby and profession can come when a person is, for example, a writer who uses a system for text editing or a businessman who uses a system for computational tasks. Hald knows one architect who uses his hobby system for doing his contract bidding.

People want to get involved with microcomputing as a hobby, he said, but they also are looking for some long-range applications, like the retired person he knows who is working to develop a system to help the blind interact with a CPU.

The hobbyist is generally buying an integrated system consisting of a microprocessor unit (MPU) with about 8K bytes of memory, Hald said, but it is not unusual to find some systems with a standard of 16K to 24K bytes of memory. The systems are initially tape-oriented, but now people are getting floppy disk systems.

This increase in the number of floppy disk systems is driving the average investment in a microcomputing system up from the $1,500 to $3,000 range to the $4,000 to $6,000 range. The higher investments are not uncommon, especially since the price of CRTs is coming down and they are easily within the reach of the hobbyist.

Most of the hobbyists are still involved with 8-bit machines, Hald said. The 8080 is still king, but the Z80 is "hot on its tail."

Some 16-bit machines are emerging as the systems for small businesses that require greater capabilities, such as some form of mass storage and access to established software.

Each of the different categories of hobbyists is approaching the problem of system cost in a different manner, Hald noted. Prices are a main concern for the pure hobbyist, who is able to keep costs to bare bottom by building most or all of the system, often just for the joy of builidng.

The hobbyist who would like to build a kit doesn't consider cost a critical factor. The purchase of a system for this user doesn't have to be cost-justified because it is purely for personal use.

The casual hobbyist, on the other hand, is often interested in a micro only if it can do a certain job and if it is somehow cost-justified.

All three types of hobbyists are going to be quite dependent upon the retail store, which will fall in two categories, he said.

The systems store will be the main place for the hobbyist, he predicted, noting that the user will be able to find everything from the smallest micro up to small minicomputers.

Turnkey Based on 8080

PALO ALTO, Calif. — Promedics Data Corp. has introduced a turnkey microcomputer system for accounting applications in medical offices that incorporate a hobby microcomputer and standard peripherals.

The PAC 1 is an 8080-based system that uses the S-100 bus design and incoporates dual Shugart Associates floppy disk drives, a Digital Equipment Corp. LA-36 hard-copy printer and a Perkin-Elmer Fox CRT. The turnkey system uses Promedics applications software.

The system allows a doctor or small clinic to establish uniform accounting procedures for patient ledgers and gives random access to patient information seconds after the account is keyed in, according to a spokesman. A special report generator allows each end user to configure individual reports using any information stored in the patient data base, he added.

The current PAC 1 uses two 16K dynamic memory boards, a dual serial I/O board and either a Z80 or 8080 MPU card. An additional disk interface card is also housed in the system, he said.

Complementing the hardware is a disk operating system and language compiler/interpreter that generates pseudo operating code which can be run independently from the source code.

The disk operating system takes up approximately 20K bytes of memory, leaving 12K for application and data, the spokesman noted. Larger programs can be implemented by either adding more memory or using the operating system's overlay capabilities, he claimed.

Found Reliable

Promedics has found the hobby-type computer mainframe to be reliable and cost-effective when built and tested to commercial standards, he said. The firm is committed to microcomputers and believes "hobby computers are here to stay if they can be used for practical DP applications and achieve a price/performance ratio lower than their competition," he stated.

A PAC 1 system costs $13,500, which includes operator training and support for one year. Promedics is at Suite 210A, 560 San Antonio Road, Palo Alto, Calif. 94306.

Controller Gets Basic I/O Driver

VAN NUYS, Calif. — Roche Systems has enhanced its multicassette controller with an I/O driver for Basic, the firm said. Basic programs can now read records from cassette tape and write records to cassette tape under program control, a spokesman explained.

The I/O driver is accessed from Basic and handles all I/O to either the cassette operating system or to the console. The cassette operating system opens and closes files.

When a logical record is written, the blanks are compressed out and the record is stored in a buffer. When the buffer is filled, the physical record is written into the cassette, the spokesman said.

Each read from the cassette brings 256 bytes into the input buffer. Blanks are added back into the logical records and they are passed on to the program for processing one record at a time, he noted.

The multicassette controller, which plugs into an interface board, comes in two models, a 4-port kit that costs $140 and a 2-port kit priced at $110.

Software included consists of the cassette operating system, Basic I/O driver and listing, assembler with patches to assemble large programs from tape, demo Basic program and demo record file.

Optional application software is available for such functions as text editing, formatting, sorting and merging, the spokesman said from the vendor at 7101 Mammoth Ave., Van Nuys, Calif. 91405.

Line Tamers Regulate Voltages

ADDISON, Ill. — Shape Magnetronics, Inc. has expanded its line of constant voltage transformers by adding the LT-2 series of Line Tamers.

The LT-2 series units have low harmonic content and can be used to prevent memory loss and operating errors caused by line noise, spikes and transients, the firm claimed.

The series will produce regulated output voltages of 120Vac or 120- and 240Vac. Output will vary less than 3V RMS from nominal for total input variations up to 35V RMS for the 120V transformers, Shape said.

Volt-ampere ratings of the transformers range from 500VA to 7,500VA, and all transformers rated at 2,000VA and below are provided with output recepticles, an on/off switch, line cord and indicator light.

The units are designed for 60Hz operation.

Prices range from $212.50 to $1,335, a spokeswoman said from 815 Kay St., Addison, Ill. 60101.

8080 Can Use PDP-8 Software

SAG HARBOR, N.Y. — The Amide Corp. here has introduced a simulator that allows 8080 users to utilize Digital Equipment Corp. PDP-8 programs.

The software is available in two formats, Intel paper tape and Intel Tarbell cassette, according to a spokesman. It comes with a user's manual, PDP-8 programming tutorial, PDP-8 loader, Decus library information and a source listing of the I/O routines.

The paper tape version costs $20 and the Tarbell cassette costs $23 from the firm at P.O. Box 600, Sag Harbor, N.Y. 11963.

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Mijobe Offers Altair Power

UPLAND, Calif. — A custom power supply kit for the direct replacement and upgrading of the power supply provided with the Mits, Inc. Altair 8800 microcomputer is available from the Mijobe Corp.

The Mijobe kit 10-1026K reportedly enables the user to operate a full complement of plug-in boards with a safety margin of power.

The design incorporation of grounded electrostatic shielding between the primary and secondary windings of the kit's transformer virtually eliminates the propagation of external electrical noise into the microcomputer itself, the firm claimed.

The unit operates from 110- to 130 Vac, 60Hz, single-phase power and provides outputs of 16 Vdc +2A and one output of 8Vdc at 20A with forced air cooling.

The unit costs under $60 from Mijobe at 657 N. Benson, Upland, Calif. 91786.

Compiler Basic Comes on Tape

CERRITOS, Calif. — Software Dynamics has a compiler version of Basic for 6800-based microprocessor systems.

The Basic permits decimal arithmetic, formatted output, file I/O and multiple statements per line.

The Basic compiler costs $150 and comes in a cassette tape formatted for the "Kansas City" standard. Software Dynamics is at 17914 S. Laurelbrook Place, Cerritos, Calif. 90701.

Drives, S-100 Linked

CULVER CITY, Calif. — Info 2000 here has an adapter to interface Persci, Inc. diskette drives to S-100 bus microcomputers, according to the firm.

The adapter costs $120 in kit form and $195 fully assembled and tested.

An additional 1K byte of random-access memory costs $40 and 3K bytes of optional erasable programmable read-only memory costs $120 from Info 2000 at P.O. Box 3196, Culver City, Calif. 90230.

Wintek Has Interface

LAFAYETTE, Ind. — Wintek Corp. has a cassette interface that operates at speeds up to 2,400 char./sec.

The interface supports the "Kansas City" standard.

The interface sells for $139 from the firm at 902 N. 9th St., Lafayette, Ind. 47904.

Chess Out in Basic

COCKEYSVILLE, Md. — Chess, in standard Basic, is available from Tenberg Software Systems here.

The program takes 16K bytes of memory, a spokesman noted.

The program, on paper tape with documentation, costs $20 from the firm at 10311-J Malcolm Circle, Cockeysville, Md. 21030.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Hobby Havens

As a service to hobbyist readers, Computerworld *periodically will list the micro clubs in different parts of the country.*

Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at Computerworld, *797 Washington St., Newton, Mass. 02160.*

ARIZONA

The Arizona Computer Society. The society can be reached at P.O. Box 744, Goodyear, Ariz. 85338.

DELAWARE

Delaware Users of Microprocessor Systems (Dumps). Contact: David Corbishley, 12 Keith St. Kimberton, Newark, Del. 19713. Telephone (302) 737-3367; in New Jersey, telephone (609) 921-3260.

ILLINOIS

The Peoria Area Computer Club (Pacc). Contact: Anthony M. Drake, 2019 N. Idaho, Peoria, Ill. 61604. Telephone (309) 682-5894.

LOUISIANA

Northwest Louisiana Computer Group. Contact: Michael Murray, P.O. Box 8843, Shreveport, La. 71108. Telephone (318) 635-4643.

Debach Computer Club. The society is at Rt. 3, Box 110, Dubach, La. 71235.

Crescent City Computer Club. Contact: Emile Alline, 1119 Pennsylvania, Slidell, La. 70458.

NEW MEXICO

Albuquerque Computer Club. Contact: Gary Tack, P.O. Box 866, Corrales, N.M. 87048.

OHIO

Southeast Ohio Computer Society. Contact: Dennis Anderson, P.O. Box 67, Cambridge, Ohio 43725.

OKLAHOMA

Central Oklahoma Computer Association. Contact: Lee Lilly, P.O. Box 2213, Norman, Okla. 73070.

Oklahoma City Computer Club. Contact: Bill Cowden, 2412 S.W. 45th, Oklahoma City, Okla. 73119.

TEXAS

Texas A&M University Microcomputer Club. The society can be reached at P.O. Box M-9, College Station, Texas 77844.

Texas Computer Club. Contact: L.G. Walker, Rt. 1, Box 272, Aledo, Texas 76008.

Panhandle Computer Society. Contact: Tex Everett, 2923 Spring, Amarillo, Texas 79103.

Central Texas Computer Society. Contact: Ray D. McCoy, P.O. Box 17303, Austin, Texas 78760.

Microputer Tinkers & Bug Busters. Contact: William Peters, 3845 Le Bleu, Beaumont, Texas 77707.

Lamar University Computer Club. Contact: Tim Magnuson, L.U. Box 10996, Beaumont, Texas 77710.

El Paso Computer Group. Contact: Jack O. Coates Jr., 213 Argonaut No. 27, El Paso, Texas 79912.

Computer Hobby Group of North Texas. Contact: Bill Fuller, 2377 Dalworth, No. 157, Grand Prairie, Texas 75050.

Houston Amateur Microcomputer Club. Contact: Cliff Carley, 4506 Woodside, Houston, Texas 77023.

South Texas Computer Club. Contact: Ray Atnip, Suite 125, 11246 S. Post Oak, Houston, Texas 77035.

Permian Basin Computer Group. Contact: John Rabenaldt, P.O. Box 3912, Odessa, Texas 79760.

Northside Computer Group. Contact: Jim Aldridge, 2318 Townbreeze, San Antonio, Texas 78238.

San Antonio Computer Group. The society is located at 7517 Jonquill, San Antonio, Texas 78233.

Nasa-JSC Computer Hobby Group. Contact: Marlowe Cassetti, 1011 Davenport, Seabrook, Texas 77586.

Heath Course To Teach Basic

BENTON HARBOR, Mich. — Heath Co. introduced a self-instruction course in Basic language programming techniques.

The course was designed "to teach even those with little or no computer experience the skills necessary to intelligently converse, create and program in Basic," a spokesman said.

Programmed instruction tests combined with demonstration programs and practice problems are employed in the course to teach Basic formats, commands, statements and procedures.

The course is keyed to the Heath computer systems; however, because of the universal machine-independent nature of Basic, it can be a supplement to any other computer systems using Basic, the spokesman noted.

The course, EC-1100, costs $29.95 from Heath at Dept. 350-450, Benton Harbor, Mich. 49022.

RAM 'Semikit'

EMERYVILLE, Calif. — A 16K-byte random-access memory (RAM) board in semikit form has been introduced by Processor Technology Corp.

The RAM board is, despite the "semikit" name, fully assembled and wave-soldered with pretested integrated circuits.

Board capabilities include independently addressable 4K-byte blocks, 5 watt power consumption, invisible refresh and 400 nsec worst-case access time, he claimed.

The board also has built-in backup power connections, he noted.

The board costs $369 in semikit form and $399 fully tested and burned in form from the firm at 6200 Hollis St., Emeryville, Calif. 98608.

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Interim Relief Viewed IBM Trial Option

By Molly Upton
CW Staff

What are the alternatives to a trial — U.S. vs. IBM — that seems like it will last forever?

Justice could ask for interim relief which, if granted, could tie IBM's hands in specified areas. A likely time for such a motion would be at the completion of the government's case, observers recently indicated.

There could be a settlement, but sources generally discount that possibility for the present. One industry analyst, however, said the Greyhound decision [CW, Aug. 29] has increased the possibility of settlements in other cases pending against IBM.

One consultant believes the current antitrust case is a smokescreen for IBM. Although the general public thinks it would be unreasonable of IBM to violate the antitrust laws while the current case is being prosecuted, IBM in fact has received a monopoly license during the "interregnum" since the case was filed about eight years ago, he said.

During this time, IBM has put through a revolution, he said.

All the issues in the government case are academic, the consultant remarked. In effect, the government should abandon this suit and draw up a new complaint based on current IBM actions, he said.

Justice conceivably could ask for interim relief to prevent a continuation of this "interregnum," he said.

If the Department of Justice asks for interim relief, Computer & Communications Industry Association (CCIA) president A.G.W. (Jack) Biddle thinks Judge David N. Edelstein might well consider the motion favorably, especially in view of the fact that IBM has refused for the last 18 months to stipulate the record.

Without a stipulated record, the trial would go back to square one if Edelstein had to step down from his post, Biddle said.

And if Edelstein granted some form of interim relief, there are good reasons why IBM might not want to appeal it, he continued.

For instance, if the Second Circuit Court of Appeals and/or the Supreme Court denied the appeal, thus concurring with Edelstein, IBM's whole delaying tactic would be "blown sky high," Biddle said.

The Department of Justice, in a motion for interim relief, could seek injunctions forcing IBM to disclose its installed base on a regular basis, disclose to the industry any new de facto standards at the same time as they are introduced internally and forcing it to engage in total unbundling, Biddle suggested.

On the other hand, another possibility is that Edelstein could deny both a motion for interim relief from Justice and IBM's motion for summary judgment, Biddle speculated.

"In my opinion, based on the record, Edelstein will probably deny a motion of summary judgment by IBM because the evidence is overwhelming," Biddle said.

Long Time Coming

Jim Peacock, editor of *EDP Industry Report*, a newsletter from International Data Corp., observed that if the trial continues as scheduled, the decision probably would not be forthcoming until the early 1980s — and then it will be essentially academic unless Justice keeps bringing in new issues, he said.

Thus there is the possibility Edelstein could invoke an interim relief after the government presents its case, he added.

The powers of interim relief can be very broad, Peacock said, observing one judge used them to tell a firm to fire its president.

However, Cal Crary, litigation analyst for Bache, Halsey, Stuart and Shields, sees no possibility of any motion for interim relief in the near future.

(Continued on Page 67)

Two Pico Directors File Charges Against Firm's Chairman Potter

By Toni Wiseman
CW Staff

PLAINVIEW, N.Y. — Two directors of Potter Instrument Co. (Pico) have filed a series of applications and complaints charging company founder and chairman John T. Potter Sr. with misappropriation of company assets, failure to perform duties and harassment.

The actions were filed in the U.S. District Court for the Eastern District of New York here by Samuel A. Alexander, vice-president, and David Porter, secretary, both of whom Potter is seeking to oust as Pico directors.

Counsel for Potter called the claims "inaccurate and distorted," adding only that "Mr. Potter's response to all actions will be contained in his answer which will be filed soon."

In response to the directors' applications, Bankruptcy Judge William J. Rudin signed an order requiring Potter to show cause by Sept. 12 why Pico should continue to pay him "any further remuneration or compensation."

The first action filed by Alexander and Porter asks for the return of two 1971 Cadillac Eldorados which Pico has been maintaining at "a cost in excess of $1,000 per year per automobile" and of a 20-foot catamaran sailboat. All three items are alleged property of Pico.

In their application to cut off any further payments to Potter, the directors charged:

- "Potter is not now performing any work or services for Pico and only rarely is he at Pico's offices."
- "He has advised key Pico personnel that he will ruin Pico if he does not regain personal control of Pico."
- "Potter has deliverately attempted to subvert management policies and orders."
- "Potter has solicited and used Pico employees on company time for personal services unrelated to Pico business."
- "Potter has ordered Pico employees to cease work on projects to which they have been assigned and to work on other projects which interest Mr. Potter personally."
- "He has created extreme disruption, confusion and turmoil among Pico employees by making excessive and unwarranted demands for papers, documents and information, by promoting the so-called 'merits' of his lawsuit against . . . Alexander and Porter . . . and by threatening employees with the loss of their jobs if they did not assist him in his attempts to oust . . . Alexander and Porter."

A third action charges Potter "unlawfully received and collected from Pico a sum of not less than $1,113,629.37 belonging to Pico, willfully, maliciously, wrongfully and unlawfully converted the same to his own use." The action asks for repayment of the sum with interest.

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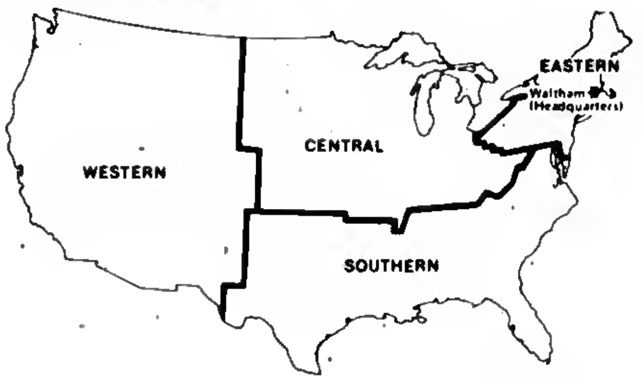

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What Might Have Been

By Molly Upton
CW Staff

NEW YORK — IBM's Input/Output Division was ready, willing and able to produce lower cost terminals and other peripherals in 1964 than IBM's current product line, according to a memo from G.W. Tuttle to J. McDermott entered as evidence in the U.S. vs. IBM trial here.

The memo outlining the division's capabilities was issued July 17 in response to the System 360/Compatibility Committee's expectation of plug-to-plug competitiun in both the peripherals and systems areas [CW, Sept. 5].

McDermott was chairman of the processor group of the compatibility committee and Tuttle was a member of the I/O group.

The memo contained recommendations from the Product Review Board of the I/O Division.

The I/O Division was also developing a "flexible file" with a capacity of up to 11 million characters.

"We feel in looking over our laboratories that we can develop a complete line of terminal equipment at more than 20% off IBM prices. Evidence that this can be done has been shown by the Friden Collectadata, the Tele-Register 200 and the Teletype Data Speed.

"In addition, we are planning to spend additional development dollars for industry-oriented terminals," Tuttle's memo said.

The I/O Division planned to make tape drives that it considered to be attractively priced for use in conjunction with the 360. The prices per drive were about $100 less than those quoted for current IBM drives.

The controller for printers and I/O equipment proposed by the division would be a nonprofit item priced at about $600 compared with the IBM existing price of $1,045.

"We will continue our development work, however, on a flexible file with a goal of $475 to $675 with a control price of $350. This file will have a capacity of up to 11 million characters and would compete with the 2311 which rents for $575 with the control at $525 and a capacity of 14.5 million," the memo said.

Interim Relief Seen Trial Option

(Continued from Page 65)

Justice could conceivably file such a motion at the time Edelstein announces his decision, he said. Edelstein's ruling will prubably favor the Justice Department, Crary added.

He expects IBM to file for summary judgment and added he would be very surprised if Edelstein granted that.

Commenting on the Ninth Circuit Court of Appeals' decision remanding the Greyhuund Computer Corp. vs. IBM antitrust case back to trial, Peacock said it could open the door for more settlements between various plaintifs and IBM.

He declined to speculate on whether the Justice case might also be a candidate for settlement. The stakes are bigger and the process interminable, he commented.

However, he said, the others all will settle if the price is right.

The Ninth Circuit's extensive opinion seemed to clarify a lot of issues in the cases from a legal point of view and should certainly improve the atmosphere for settlement by IBM of some or more of the cases, he said.

The decision in the Greyhound case means it is very likely the California Computer Products, Inc. vs. IBM case will also go back to trial. In addition, "now Memorex knows what kind of atmosphere it is looking at up the ladder, so the signs are not great for IBM, which might be more willing to settle some cases," he observed.

The Ninth Circuit is also the appeals court for the Memorex and Calcomp cases, he noted.

Extensibility Seen Trend In Industry

PORTSMOUTH, N.H. — "The overriding trend (in the computer industry) can be characterized as 'computer extensibility,'" according to Jerome Kanter, Honeywell Information Systems' product director for minisystems.

"Computers and electronics are reaching out more and more — from individual company sites to intracompany remote networks to intercompany/interindustry systems . . . Computers are reaching and influencing small elements of the community such as the auto parts dealer, the gasoline station attendant, the small business merchant, the professional man and even the household," Kanter said.

"This extensibility is made possible by the computer trends of transaction processing . . . networking and distributed processing," he added.

Most enterprises are constantly considering two major managerial decisions concerning data processing: whether DP functions should be centralized or distributed, and whether managerial control of these operations should be centralized or distributed, Kanter told a group of financial analysts at the Mini/-Micro Industry Conference here recently.

Looking toward the future, Kanter said that both the OEM and system builder "want the mini vendor to furnish more of the basic hardware and software for their systems. They can then concentrate on . . . doing what they do best, whcih is application software, industry know-how and specialized marketing capability.

"Frankly," Kanter continued, "this allows us to do what we do best, which is providing more pieces of the system."

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International News

DBL Cites Problems

Reports of Japanese Threat Called 'Exaggerated'

By Toni Wiseman
CW Staff

NEW YORK – The Japanese computer industry's threat to IBM and other U.S. manufacturers has received a great deal of coverage, but that coverage has been largely one-sided and exaggerated, according to a report published by Drexel Burnham Lambert, Inc. (DBL).

In fact, the report listed 17 separate reasons why the Japanese may not be so tough.

The report acknowledged several truths: the Japanese government has "(1) organized consortiums of computer companies, (2) assigned specific tasks to each company, (3) subsidized computer R&D, (4) purchased domestically made computers almost exclusively and (5) provided financing for companies leasing Japanese computers."

However, without wishing to belittle the Japanese threat, DBL emphasized that "formidable obstacles stand in the way of Japan, Inc." and that in its opinion "the brouhaha about the potential impact of Japanese exports on U.S. computer manufacturers has been exaggerated."

The report pointed out, for instance, that while several countries have successfully competed with Japan for various export markets, such as Germany and automobiles, only the U.S. has ever successfully exported computers.

In addition, computers are more complex than any other product that Japan has successfully exported, it said.

Software is a third problem for the Japanese. "Japan may have caught up with the U.S. in hardware, but industry experts acknowledge that Japan is still far behind in the development of software,"DBL stated.

The report also suggested the Japanese might face language problems in Western Europe, which Americans would not since English is widely spoken.

"The language barrier does not pose a serious problem when selling consumer or price-oriented products; however, it presents a formidable obstacle when selling complex products, such as computers," the report indicated.

And then there is IBM. IBM's recently announced 3033 has 2.5 times the price/performance of a 370/168-3, the report noted, adding this is the market the Japanese will be competing in since, in 1976, 57% of the Japanese installed base was large-scale systems.

DBL saw service as another possible problem for the Japanese. "A network of maintenance centers is a prerequisite for selling computers in quantity," it said, but "a maintenance network is hard to start, difficult to staff and expensive to support."

Depressed Stocks

"In recent months, the stocks of American multinational companies have been depressed because of fears of foreign nationalism and lagging economic growth overseas," DBL stated.

"Those same problems would affect Japan, Inc. even more than [its] U.S. counterparts, yet the Japanese threat appears to remain undiminished in the eyes of many analysts.

"Moreover, in most countries, U.S. companies have become firmly entrenched and tolerated, while the Japanese have become unwelcome because of their surging exports and resulting trade imbalances.

"Japanese computer exports represent a threat to the status quo and, ipso facto, the health of struggling foreign computer companies."

While many view Japanese government subsidies as an added threat to the U.S. market, the report observed that many of these subsidies cannot be transferred abroad – i.e., government purchases of Japanese computers and financing of domestic leasing firms.

"So although the Japanese computer industry has enjoyed considerable success at home, it may not be indicative of the potential for success overseas," the report said.

In fiscal 1976, Japan produced about $2.5 billion in computer equipment, of which $71 million was exported, the report noted. Even if exports grew at the government's goal of 30.4% per year, Japanese exports would reach only $1 billion by 1985, a year in which IBM revenues should be about $50 billion, according to DBL.

"Moreover, a portion of Japanese computer exports will go to markets not heavily served by U.S. companies, such as China and Korea. . .In any event, weak foreign computer companies will very likely suffer proportionately more than U.S. computer companies if Japan, Inc., were successful," the report stated.

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International News

EMM Expands in Europe

Special to Computerworld

BAD HOMBURG, W. Germany — As an extension of its expanded commitment to the end-user business, Electronic Memories & Magnetics Corp. (EMM) has expanded the European operations of its Computer Product Division.

The success of its add-on memory business philosophy in the U.S. has prompted the independent supplier of add-on memory to capitalize on the potential abroad, it said.

EMM started this foreign expansion with what it already considered a strong market position. It has established EMM GmbH as its European divisional headquarters here. The sales and service operations are directed from this centrally located area, which also has easy access to Eastern Europe.

The sales staff presently operates from Germany. However, additional salesmen will be appointed in the near future and will be located in major market areas. The company also has appointed agents in the UK, Switzerland and Austria.

Reference selling is important in Europe and the company believes it is in a good position to draw on its current customer base and parlay that success into bigger and better things. Major installations are already in Swiss and French banks, a major German automobile manufacturer and a major European airline.

Also included are one of Germany's more prominent breweries; a large construction company; one of the world's largest multinationals; and Eurocontrol, the air traffic control operation built by the common market countries and the North Atlantic Treaty Organization. Products installed cover a wide variety — from IBM 360/65s to 370/168s — with as much as 5M bytes of memory.

Eastern Market

In addition to this list, EMM has three orders from Rumania and one from the USSR. The Eastern European market appears to have enough profit potential for EMM to position itself accordingly, a spokesman stated.

Under the direction of Dieter Huhn, European sales manager, the headquarters has been staffed with "a number of people whose expertise is commensurate with the company's overall commitment," according to the spokesman.

The staff personnel offer varied backgrounds in engineering, sales and marketing — including past associations with IBM, Siemens, 3M and CMI.

EMM is looking to this European operation as a key element in future growth plans, the spokesman said.

Foreign Orders & Installations

The Centro de Investigacion Cientifica y Educacion Superior de Ensenada, a scientific research and educational institution funded by the Mexican government, has ordered a Prime Computer, Inc. Prime 400 computational timesharing system to be used for seismic and oceanographic analysis projects.

The Overseas Fixed Telecommunication Service has ordered Codex Corp. 6000 Series Intelligent Network Processors and LSI high speed data modems worth over $1,000,000.

Toyota Auto Body Co., a Japanese automobile body manufacturer, has ordered a Univac 1100/11 system for use in on-line control system covering planning, phototype production, testing and preparation of new cards.

The Telephone Authority of Singapore has ordered 300 medium-speed modems from General Datacomm Industries, Inc.

The Australian Broadcasting Commission has ordered two PAL version Compositor 1 systems from TeleMation, Inc. to be used for graphics geneation in their Melbourne and Sydney stations.

International Studies Set

MANCHESTER, England — The Council of the European Communities has approved a group of studies in support of the use of data processing which will be carried out in collaboration between The National Computing Centre in the UK, Gesellschaft fur Mathematik und Datenverarbeitung (GMD) in Germany, Institut de Recherche d'Informatique et d'Automatique (Iria) in France and Consiglio Nazionalle Delle Ricerca (CNR) in Italy.

The studies, which cover work related to privacy and security, data base and programming techniques, will be financed half by the European Economic Community (EEC) and half by the various nations concerned.

Given approval for the further stages currently envisaged, the cost of the entire program for all four countries will probably total about $1.4 million.

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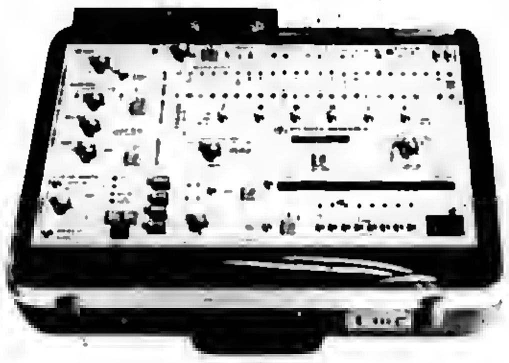

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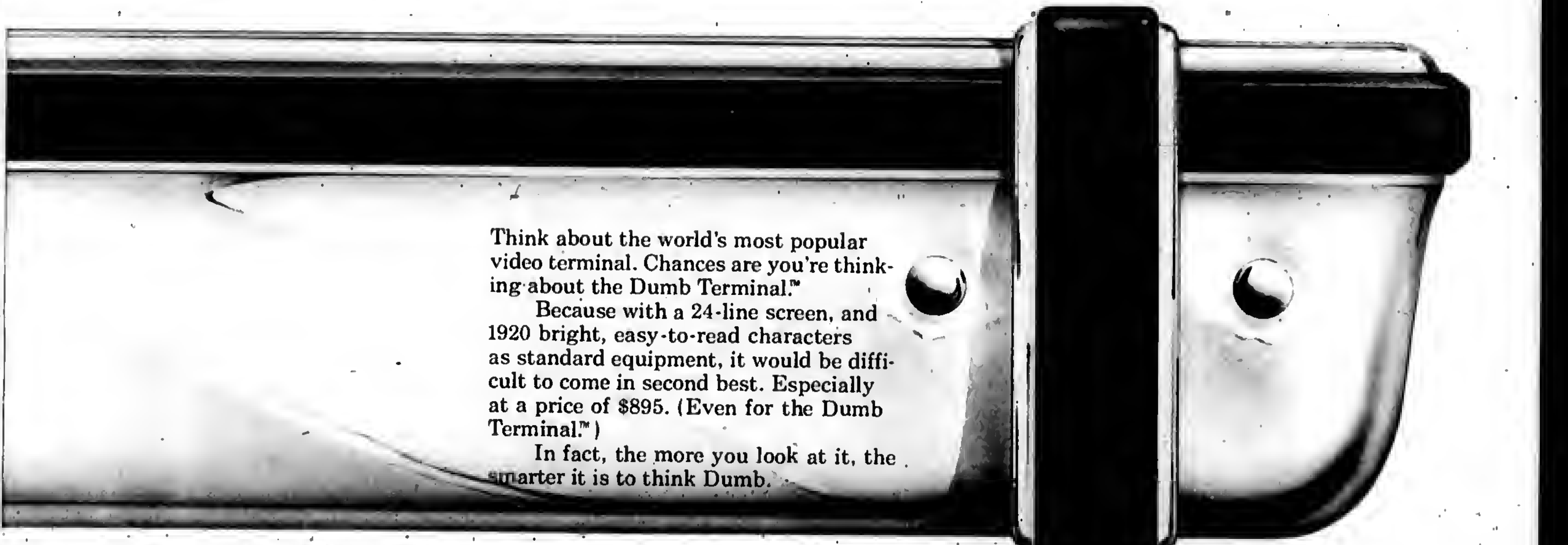

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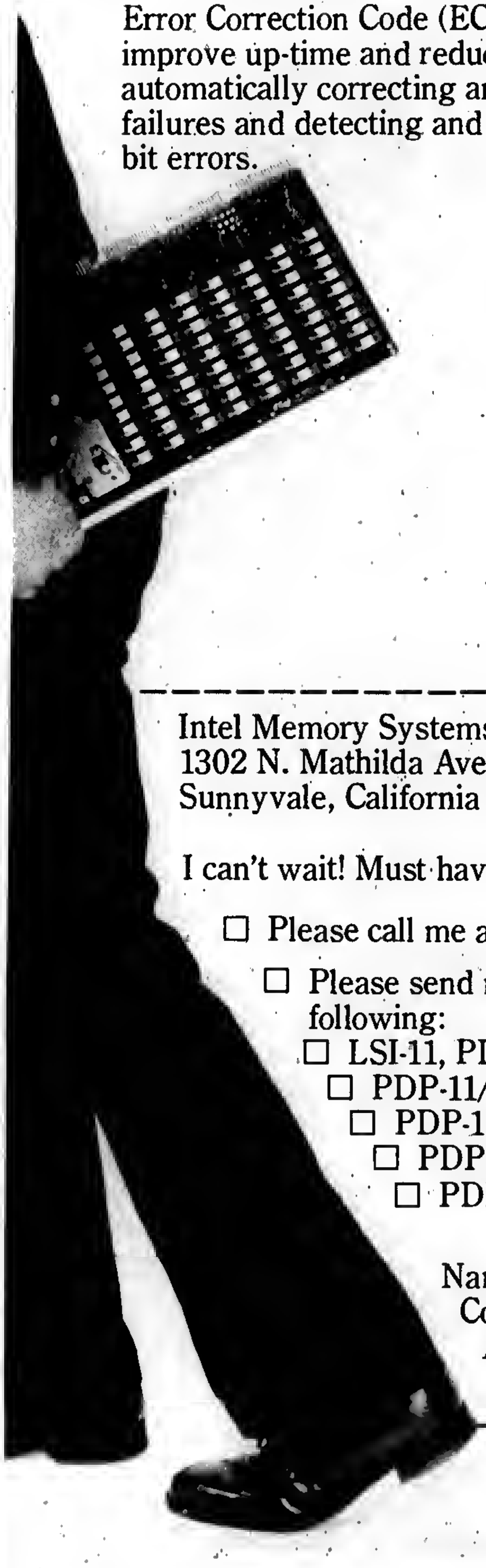

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Adapso Sets Theme

SAN FRANCISCO — "Responding to Change —A Program of Action" is the theme for the Association of Data Processing Service Organizations' (Adapso) 47th Management Conference.

The conference, which will be held in conjunction with Adapso's first computer services industry exposition, will take place at the Hyatt Hotel on Union Square here Oct. 19-21.

Workshop topics will range from "User Panel: Why Buy Computer Services," "Running a Small Data Center for Profit" and "How to Make Money in the Mini-Micro-OEM Marketplace" to "Taxation," "Acquisition Strategy" and "Is There Any Accounting for Software?"

There will also be general sessions dealing with communications activities, security and the computer services industry and IBM and the U.S. computer services industry.

Registration for the conference is $195 for Adapso members and $295 for nonmembers, with discounts for additional registrants from the same company. Further details are available from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

Acquisitions

Dun & Bradstreet has agreed in principle to acquire **Technical Publishing Co.,** publisher of *Datamation*, for Dun & Bradstreet stock with a current market value of about $45.6 million.

TRW, Inc. has acquired **Gier Electronics GmbH** of Hanover, a German distributor of American DP equipment.

Perkin-Elmer Corp. and **Physical Electronics Industries, Inc.** have merged. Under terms of the agreement, four shares of Perkin-Elmer common stock will be exchanged for each share of Physical Electronics common, resulting in the issuance of approximately 540,000 shares of Perkin-Elmer common. Physical Electronics will operate as a wholly owned subsidiary of Perkin-Elmer.

Systems Dimensions Limited (SDL) has received a formal offer from **Sun Life Assurance Co. of Canada** to purchase all common shares of SDL at a price of $4.50 (Canadian) per share.

Itel Corp. has acquired certain assets of **Bankputer Corp.** for an undisclosed amount of cash.

Medical Computer Systems, Inc. has agreed in principle to acquire all of **Health Management Corp.'s** 1,040,000 common shares outstanding through a swap of stock.

Digilin, a manufacturer of digital panel meters, has been acquired by **Dynamic Sciences, Inc.** for cash.

Membership Still Open In Battelle EFT Program

WASHINGTON, D.C. — If you supply or are interested in suppliers of electronic funds transfer (EFT) systems, you might want to investigate a research program currently being conducted by Battelle Memorial Institute.

Titled "A Worldwide Study of Electronic Funds Transfer Systems and Equipment Requirements," the proprietary project is the third in a series of international payment systems studies run by the institute.

Co-sponsored by several supplier organizations, the study will analyze the market for EFT delivery systems and components within selected countries.

EFT models will be developed for each nation investigated, including Belgium, Canada, France, Germany, Italy, Japan, The Netherlands, Spain, Sweden, Great Britain and the U.S., according to Joanne Hartley, the project's manager.

An initial interactive workshop session with the sponsors has been held at Battelle Columbus Laboratories, but membership in the program is still open, Harley said.

In profiling the worldwide markets for EFT delivery system components, the Battelle project team will analyze global issues that affect all suppliers as an industry, as well as specific issues which affect different supplier types, Hartley said.

Among the issues to be investigated are standards, security, communications traffic, transitional technologies and functional specifications for EFT equipment, Hartley said.

The institute hopes for as much interaction as possible between the clients of the study and its project team.

A major Battelle objective is to determine what experience or technology might readily be transferred from one country to the next, the project manager stated.

The sum of $18,000 and participation will give you a full sponsorship in Battelle's study. Further information is available from Hartley at the institute's Washington operation, 2030 M St. N.W., Washington, D.C. 20036.

CCIA Reelects Amdahl

WASHINGTON, D.C. — Dr. Gene M. Amdahl, chairman of the board of Amdahl Corp., has been unanimously reelected chairman of the Computer & Communications Association's (CCIA) board of directors.

Four regional vice-chairmen were also elected: Timothy C. Cronin, chairman of the board of Inforex, Inc., for the eastern U.S.; Harold E. O'Kelley, president of Datapoint Corp., for the central U.S.; Ryal R. Poppa, chairman of the board of Pertec Computer Corp., for the southwestern U.S.; and Richard Lussier, executive vice-president of Itel Corp., for the northwestern U.S.

A.G.W. Biddle was reelected to the post of CCIA president.

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DDP Seen Making Users More Independent

BOSTON — As the industry moves toward distributed processing, users will and should become considerably more independent than they have been traditionally, according to an NCR executive.

"They no longer see themselves tied to a particular vendor," G.P. Williamson, an NCR marketing vice-president told a group of electronics analysts here recently.

"In fact," he said, "the particular vendor to whom they are most likely tied has not, typically, been a leader in moving into distributed processing. More likely than not, when today's user begins implementing a distributed processing network, he will be moving into a non-IBM world."

Williamson said, the key element in distributed processing is the inclusion of a distributed data base. "It means that not only is processing power distributed to whomever needs it, but also that the data base is distributed along with responsibility for the system."

Distributing responsibility for the system to the end user, Williamson added, is one of the biggest reasons distributed processing will eventually become the dominant form of processing.

End User Responsibility

"Complete responsibility can be fully allocated to the actual end user of the system," he said. "The people who control the budget and put out the money will no longer have to handle DP as a single general-overhead type of account. They can allocate its cost to a specific end user, just as they allocate payroll or material costs today.

Also behind the trend toward distributed processing, Williamson said, is the reduction in processing costs.

"We are on a downhill cost curve so far as memory, processor and communications costs are concerned, and those lower costs are making possible different approaches to information handling.

"In the area of memory, charge-coupled devices and bubbles, now becoming commercially feasible, offer great potential for lowering costs in some applications. Fixed-head disk technology, solid-state storage, and helical-scan, mass-storage systems promise equally dramatic price/performance improvements in the area of auxiliary storage."

Although the trend toward distributed processing is very strong, it will be several years before it materializes on a wide, general scale, Williamson said.

One reason is that large CPU's still enjoy a price/performance advantage over small systems. "However, given the continuing decline in the absolute amount of cost difference in units of processor power between large and small computers, it is becoming increasingly attractive to exchange this large-system advantage in return for the efficiency gains achieved when information, processing power and the responsibility for them are placed where they are most needed," according to Williamson.

A second reason for distributed networks' not becoming widespread overnight, he said, is that the currently installed base of computer systems is primarily a centralized, batch-oriented base. "That investment in equipment and software cannot be lightly tossed aside. It will continue in place and will be enhanced. Existing equipment and systems continue to function; new systems will supplement, rather than replace current systems."

Williamson also cited the current lack of distributed data base software. "It is for that reason, more than any other, that today the industry finds itself primarily in an era of announcements so far as distributed processing is concerned. The technology is here and systems are in operation. Generalized systems are on the drawing boards and in fairly advanced stages. But the missing link is software. In the end, it will be software — data base software, terminal control software, networking software — that will determine success or failure in this field.

System 'Free' With Software

IRVINE, Calif. — Liberal Computer Corp. is promoting the concept of "rebundling," according to chief executive officer Bernie Lumbert.

The firm plans to provide a microprocessor-based system free — along with the $200 monthly rental fee for software, he said. There will be an additional charge for customized software, he added.

Liberal's product will be called the "Generous/1" and will consist of a Motorola 6800 with 32K, a Shugart floppy disk drive, a Lear Siegler CRT and AT&T's Dataspeed Model 43, he said.

Initially, Lumbert plans to concentrate on the word processing and text editing area and then broaden into small business applications such as general ledger, he said.

More specifically, he said, he is looking at the mortgage banking document area as well as packages for small banks.

The time has come once again for "rebundling," he said, noting Eastman gave away cameras and Gillette gave away razors when starting their businesses.

Liberal Computer Corp. is at 4301 Birch, Newport Beach, Calif. 92660.

COMPUTERWORLD INDEX

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- There are entries by *product or service*, like *PRINTERS*, which has 37 entries in the six-month period covered; or *LEASING*, which has 10.
- There are entries by *industry*, like *INSURANCE*, under which there are 17 entries for various stories on the use of computers in the insurance industry.
- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory, security* and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- ... and there are *others: KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries ... and there's much, much more.

Company Names, for example, are a very important part of The Index. Looking under IBM, we find *ten* categories:

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Rank as importer from US: *Third*

Computer Management is a monthly magazine recently purchased by *Computerworld, Inc.* Monthly circulation is 30,000.

COMPUTERWOCHE

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1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by *Computerworld, Inc.* It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER

JAPAN

World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
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Rank as importer from US: *Fifth*

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ZERO-UN INFORMATIQUE

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DATANEWS

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DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by *Computerworld, Inc.* and has a circulation of 7,000.

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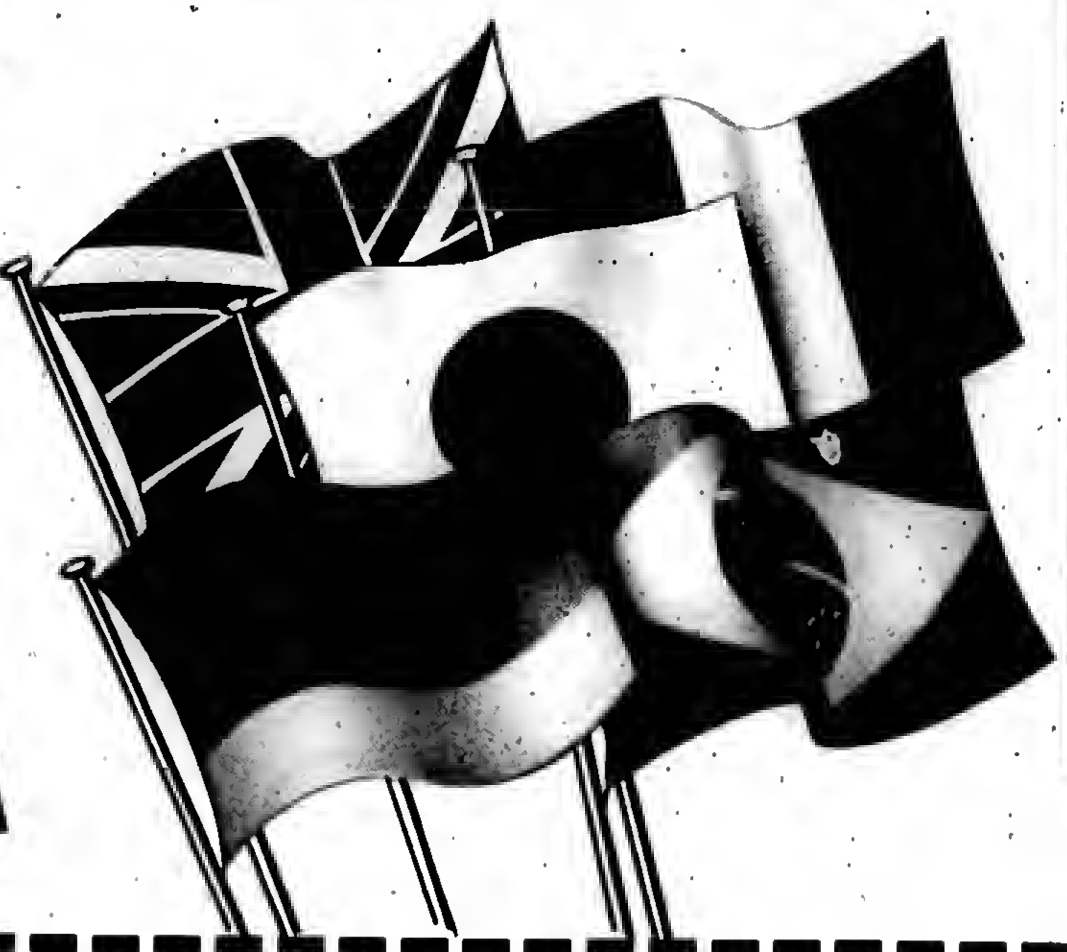

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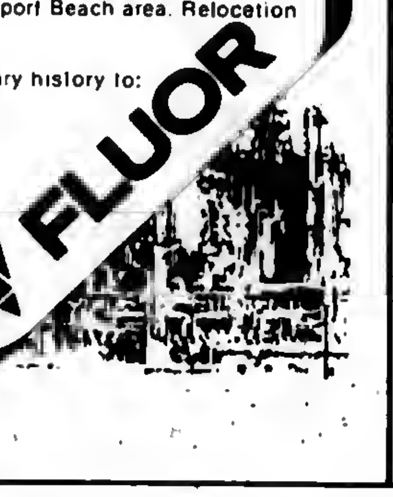

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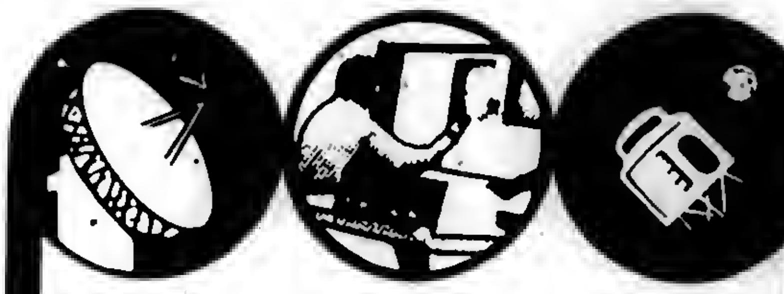

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to create all Amdahl SCP maintenance materials. You should possess a detailed knowledge of the VS1, MVS, VM or SVS operating system internals as well as a good working knowledge of utilities, SMP and assembler language. Current openings are in the San Francisco Bay Area.

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to work with Field Systems Engineers at customer locations solving difficult problems. You will also assist customers and Field Systems Engineers in the complex area of system performance and tuning. You should have very good diagnostic techniques and MVS, VS1, VM or SVS internals experience. Current openings are in the San Francisco Bay Area.

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This position requires 5 or more years in supporting operating systems through internal specification and a proven track record in supervising the software function. This key management position calls for strong leadership skills and the capability to interface consistently with top management.

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For consideration, you will need a 2-3 year background as a programmer analyst or senior programmer, heavy experience in BAL and a working knowledge of COBOL, CICS and OS training. Any on-line real-time teleprocessing experience would be a plus. Primary emphasis will center on your interest in taking up professional project supervisory responsibilities as a lead programmer.

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We wish to provide applications programmers with an opportunity to further develop and enhance their EDP backgrounds thru company-sponsored training on CICS. Programming requirements ere 1-2 years BAL and OS expertise. Experience in an on-line real-time environment a plus. Major emphasis will be placed on new systems development.

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The University of Akron is seeking a Manager of Academic Systems and Programming who will support the Academic community in computing. The Manager reports to the Director of Computer Services and supervises seven full time computer analysts. The person we seek will have a Master's Degree in a computer-related area, and at least five years of technical experience in scientific applications. The ability to present himself/herself to all members of the academic community, discuss problems and propose solutions is a must. The position requires supervisory, technical and administrative expertise. The University supports a combined academic and administrative Computer Center with an IBM S/370-158 model III running under SVS. Timesharing with APL, CAI, and CICS is provided to the University community.

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This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

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Programming

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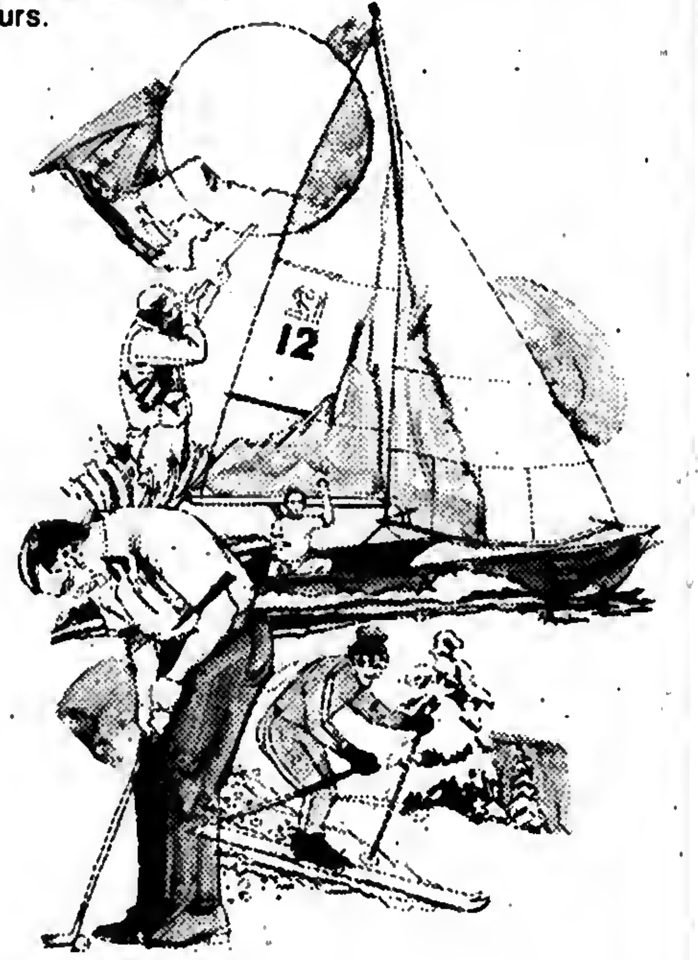

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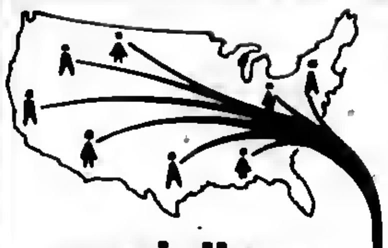

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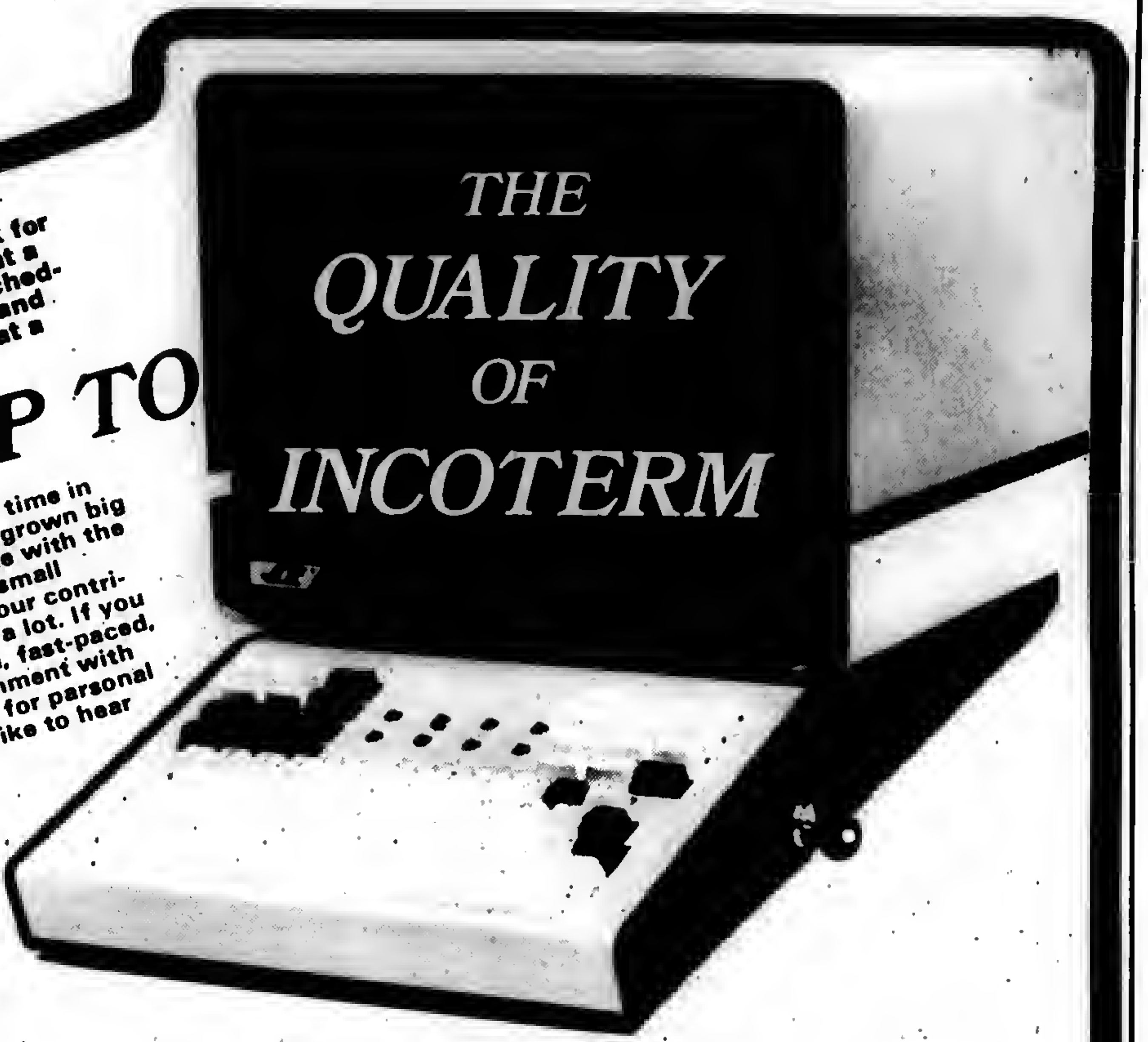

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INCOTERM has immediate openings for Systems Programmers to work on our Program Development Systems that are being developed on our PDP-11/70. These are opportunities that will provide in-depth insight into the workings of our systems and will allow for a high level of contribution and responsibility in this system development. Areas in which these programmers will be involved will be cross assembler development, macroprocessor development and the general development and enhancement of Programming Development Systems. These positions require a minimum of 3-5 years system experience, and familiarity with the PDP-11/70. Exposure to the UNIX Operating System is highly desirable.

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This job entails the successful candidate to lead a small group in the specification, design, code and testing of a contemporary minicomputer sized operating system. Are you an individual who has demonstrated the ability to put together non-trivial systems in an elegant and simple manner (as opposed to non-maintainable complex systems)? We need a strong individual who is willing to take charge in the building of an operating system.

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Clemson University is seeking a Computer Center Director to be responsible for academic, administrative, and contract computing services. The director is responsible for the host computer facility (IBM 370/165-II under MVS) as well as local and remote terminal networks. The director will maintain computing facilities at a state-of-the-art level to support research and instructional needs as well as maintain maximum system availability for production support of statewide on-line systems. The director reviews and coordinates computer resource needs with two directors of application programming divisions which serve on-campus departments and off-campus agencies. The Director supervises managers of computer operations, software systems, hardware systems, and academic computing services. Minimum qualifications include five years experience in data processing management. Salary negotiable and commensurate with qualifications. Submit three letters of reference relevant to technical and management qualifications and complete resume to:

Search Committee, Computer Center Director, c/o Graduate School, E-106 Martin Hall, Clemson University, Clemson, S.C. 29631. Closing date for applications is Oct. 31, 1977. Clemson University is an equal opportunity, affirmative action employer.

Senior Programmers

Due to company growth we are expanding our Data Systems activities. Responsibilities include applications programming in a number of systems areas utilizing our COBOL-based Main System and our various minicomputer-based systems.

To qualify you should have a computer science degree and a minimum of two years programming experience in a COBOL environment. These interesting positions will offer you career growth along with a good starting salary and fringe benefit program.

If you are interested in joining our team of professionals, send your resume and salary history in complete confidence to:

Gail McGuire

Material Service Corporation
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Join the TI Minicomputer Team

In Austin, Texas

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System Software Designers

Take a career jump into the TI minicomputer software team. Duties will include the design and development of extensive systems level diagnostics software for 990 computers in a stand-alone and real-time environment. Excellent knowledge of assembly language programming, diagnostic software and digital logic design required. BSEE with computer science background and 3-7 years' related experience.

Product Marketing Engineer

A real opportunity to conduct market analysis and definition for minicomputers and intelligent terminals. Duties will expand to include writing new product marketability specifications, preparing business plans, competitive analysis and making pricing recommendations. Also, responsibilities will include some sales training regarding market analysis and new product strategies. Requires comprehensive knowledge of intelligent terminal/minicomputer business with related experience in product planning. Requires BS/MS in Computer Science with BA/MBA or related business experience.

Marketing Applications Engineers

Work in the forefront of new product development at TI. Duties include analysis of customer requirements and systems design. Direct daily communications in advising and counseling current and potential customers in TI's new distributed processing product lines. Individual will also develop demonstration packages and provide general technical and new product support. Software background, knowledge of digital communications and 3-7 years of directly related experience required as well as BSEE, Computer Science or related technical degree.

Product Planner

Duties would include product/marketing analysis for specific opportunities, conducting competitive analysis, developing specific marketability specifications and communications to management. Requires a BS in Engineering with an MBA preferred, and 4-7 years' experience with 2-5 years in the minicomputer or data processing industry.

Product Services Engineers

A career development opportunity in the support of new computer products from conception to field maturity. Duties will require coordination of service planning-maintenance philosophy, spares requirements, tooling, RMR, training and field installation and sustaining product until field and product reach service maturity by product and/or by account. Similar responsibility will include policy development for product maintainability, serviceability and test design. BSEE with a minimum of 2 years of design or sustaining of minicomputers or related peripherals.

Technical Writers

Experienced digital hardware and software technical writers are needed to join in the development of TI's rapidly growing minicomputer business. Electrical Engineers and computer programmers with good writing skills should also apply.

Send resume in complete confidence to: **Lee Cooke, Staffing Manager/P. O. Box 2909, M.S. 2106/Austin, TX 78769.**

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PRODUCT CONSULTANT

Product Marketing

Harris Data Communications Division has en opportunity NOW for an individual with a minimum of 3 years field sales experience in data cpmmunications hardware or software, plus marketing staff experience and a high degree of analytical skills.

The individual will be responsible for competitive analysis, short and long range planning, recommendations for product enhancement and assistance to field marketing and sales support. This position also provides interface for product development and market support.

You will be joining the marketing staff of one of the TOP companies in the industry, and will work with TOP communications specialists in a highly technical environment.

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DIRECTOR

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Ramsey County is seeking a proven manager to be its Director of Data Processing. The Director heads a 75 member department which uses a CDC Cyber 72 computer and provides services to county departments and to contract users. Current applications areas include Law Enforcement, Property Taxation, Human Services, Budgeting and Accounting and many ohters. Applicants should have a bachelor's or master's degree in an appropriate technical area or an MBA or MPA, and 10 years increasingly responsible experience in programming and systems analysis, including 4 years in a supervisory or management position. To apply send detailed resume including salary history to: John Johnson, Room 1845 Court House, St. Paul, MN. 55102. *Equal Opportunity Employer.*

SAN FRANCISCO

Our client (Major Calif. Bank) needs Systems Analysts/Systems Programmers for S.F. and L.A. locations. Comp. 20-26K. Following experience is of interest: MIS Design, IMS, MICR, OS/MVT, MVS/JES III, ASP, Hdw/Software evaluation, Planning, and forecasting, and MBA. Reply in confidence to:

Tinmen Welker & Co.
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Responsibilities: Adminster program in applied computer science; develop curriculum; advise majors; teach programming languages and systems design and analysis. Requirements: M.S. or Ph.D. in computer science, or M.B.A. Start as soon as possible. Rank and salary dependent on qualifications. Credentials to: Dean, College of Continuing Education, ROOSEVELT UNIVERSITY, 430 S. Michigan Ave., Chicago, IL 60605.

Equal Opportunity University

Computer Architecture

Our Systems Architecture group seeks talented professionals to help design future high-performance computer systems. You should have a broad educational background in EE or CS with emphasis on computer architecture or design and be familiar with most of these areas: computer systems organization; storage systems organization; operating systems theory; assembler/high-level languages; data base fundamentals. Combined hardware and software experience and familiarity with system 370 is desirable. We have immediate openings for the following positions.

SENIOR SYSTEMS ARCHITECT

You will be a key decision maker on an architectural team. You have experience in either computer systems or operating systems architecture or design.

CONSOLE AND MAINTENANCE ARCHITECT

You will be responsible for the design of system consoles and work on system maintenance strategies. You have experience or aptitude in most of these areas: small and large computer systems; diagnostics; small operating systems and project management.

STORAGE SYSTEMS ARCHITECT

You will be key in defining the architecture of of future storage and data base sub-systems. You have experience in either of these areas.

SOFTWARE SYSTEMS ARCHITECT

You will be a software systems specialist on an architectural team. You have an architectural orientation and experience with operating systems/data base, preferably on system 370.

SYSTEMS ARCHITECT

You will be a member of an architectural team working on diverse investigations. This position offers tremendous educational and advancement opportunities. You have at least 2 years' related experience.

SYSTEM PERFORMANCE ARCHITECT

You will be the performance specialist on an architectural team. You are a qualified professional in computer system performance measurement, evaluation and modeling with emphasis on architecture or design. Research into key areas of new product development will be a major responsibility.

PERFORMANCE MEASUREMENT SPECIALIST

You will be responsible for the development of measurement methodologies to provide the measurement support of future product development. The position requires broad experience and knowledge of computer system operation, measurement methods and system modeling.

WORKLOAD SPECIALIST

You will be responsible for research of computer system workload classification and analysis, including workload creation and synthesis. Research ability in the areas of performance measurement and evaluation is necessary.

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Systems

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We are seeking a top Programmer/Analyst with 2-5 years of COBOL experience who is interested in joining a progressive department. We utilize state of the art equipment including an IBM 370-158 and employ the project team approach to application development. Our EDP development is among the fastest moving in the retail world and includes the use of:

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SYSTEMS ANALYST
PROGRAMMER ANALYST

Our expanding Data Processing Division has existing openings for qualified Systems Analysts and Programmer/Analysts in our large EDP development effort.

The individuals we seek will have responsibilities in design, development and implementation of large scale health care systems.

THESE POSITIONS REQUIRE:
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Solid background in programming and system design
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SYSTEMS PROGRAMMERS & SENIOR SYSTEMS ANALYSTS

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COLUMBIA
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NCR's Communication Systems Division, specializing in the development and manufacturing of data communications products and systems, is currently expanding its COMMUNICATIONS SOFTWARE group.

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If you are seeking a challenging career with a leader in the industry, need a new lifestyle and have the above experience, we'd like to speak with you.

A degree in Engineering, Math or Computer Science is required. For consideration, please send your resume and salary requirements in complete confidence to:

NCR

Ken Unlig, Dept. CS
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Shuron Textron, a rapidly growing leader in the manufacture of prescription optical products, is seeking a strongly motivated senior programmer analyst with in-depth knowledge of COBOL and BAL. Must have 5 yrs. experience preferably in a manufacturing background. Experience with CICS, DBMOP or TOTAL is a highly desirable. We are presently operating under IBM 360/30 DOS but will be converting to IBM 370 in the near future.

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- Interfacing minicomputer or microprocessor to host IBM systems;
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- Knowledge of APL, COBOL, PL1 & Fortran. Experience with debugging & software optimization techniques. Exposure to data management & scientific data processing applications essential;
- Graphics software packages.

BS in Computer Science, Math or Physics required.

Take advantage of this opportunity to join ESL, an acknowledged leader in the field of communications, reconnaissance and data processing systems.

Please send resume, including salary history, to Arva Jost, Professional Employment, ESL Inc., 495 Java Drive, Sunnyvale, CA 94086. An equal opportunity employer. U.S. Citizenship required.

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Salary range: $12,750 to $14,850
Send resume and salary history to: Jeffray L. Kublin, Director of Computer Services, State University of New York, Agricultural & Technical College, Cobleskill, New York 12043.
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SYSTEMS PROGRAMMER PROGRAMMER ANALYSTS (3)

• SYSTEMS PROGRAMMER

minimum 1 year experience with IBM 360/370, ALC, systems generation. VM/370, VS/1, teleprocessing, and minicomputer experience helpful. College degree preferred. 18-20K

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1-2 years COBOL programming essential. Familiarity with PL/1 and/or MUMPS helpful. Experience in a University environment preferred. College degree preferred. 12-15K.

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COMPUTER OPERATIONS

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Los Alamos Scientific Laboratory, a multi-faceted national R&D facility, is seeking a professional with broad experience in FORTRAN programming for scientific applications. The position involves satisfying the software needs of LASL's multi-disciplined Environmental Studies group.

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The Urban Institute, a private non-profit social science research organization, needs a creative programmer to perform applications systems design, programming, and maintenance.

Individual will extend and improve a large model for socio-economic microsimulation; provide technical assistance and documentation to programmers and research users of the system; and provide related programming and assistance to staff members. Opportunities may exist for participation in economic research.

Experience with interactive computing in a social science research environment is essential, and experience using FORTRAN and assembly language on the DECsystem-10 is desirable. Excellent compensation and benefits program.

Please submit resume and statement of interests to: Employment Supervisor.

THE URBAN INSTITUTE
2100 M St., N.W.
Washington, D.C. 20037
Equal Opportunity Employer M/F

PROGRAMMING SUPERVISOR

Southeastern Wisconsin based system 370 model 138 installation has an opening for an experienced programming supervisor whose duties will include direct supervision of five programmer/analysts responsible for all application software. Some actual coding work may be necessary. Successful candidate will have extensive knowledge of COBOL and RPGII, as well as DOS and CICS experience. Send resume and salary history to the Southeastern Wisconsin Regional Planning Commission, 916 N. East Avenue, Waukesha, Wisconsin 53186.

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THE
OUTDOORS MAN

Firm in Mid-state Missouri needs two strong applications COBOL programmers. Degree a plus, but not necessary. Currently using 360/50 with GRASP.

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PROGRAMMER
Manufacturing Data Systems

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Qualified applicant will possess two plus years successful experience in UNIVAC 1100 series systems, ASCII, COBOL (preferably modular) and all other attributes such as data communications and distributed processing.

You will become an integral part of a small, dynamic staff, affording a self starter who can work independently and interface effectively with all levels of management a high degree of visibility and realistic financial and professional gains.

Position offers a truly competitive salary as well as participation in an outstanding benefits program designed for you and your family.

For your prompt consideration, please submit your resume including salary history and requirements in complete confidence to Larry Bohn-Manager of Professional and Technical Employment.

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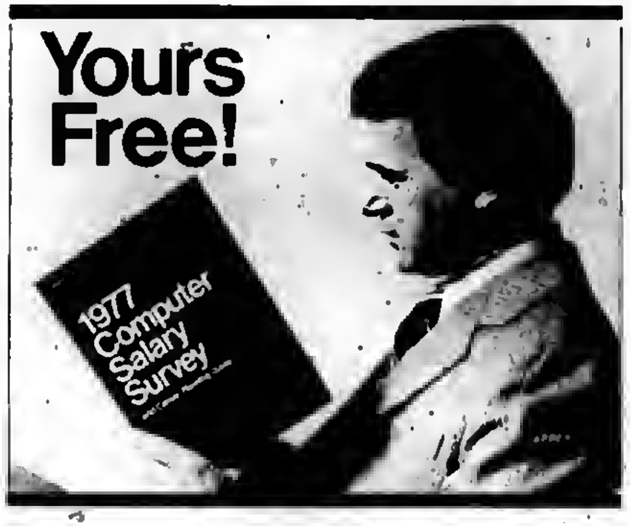

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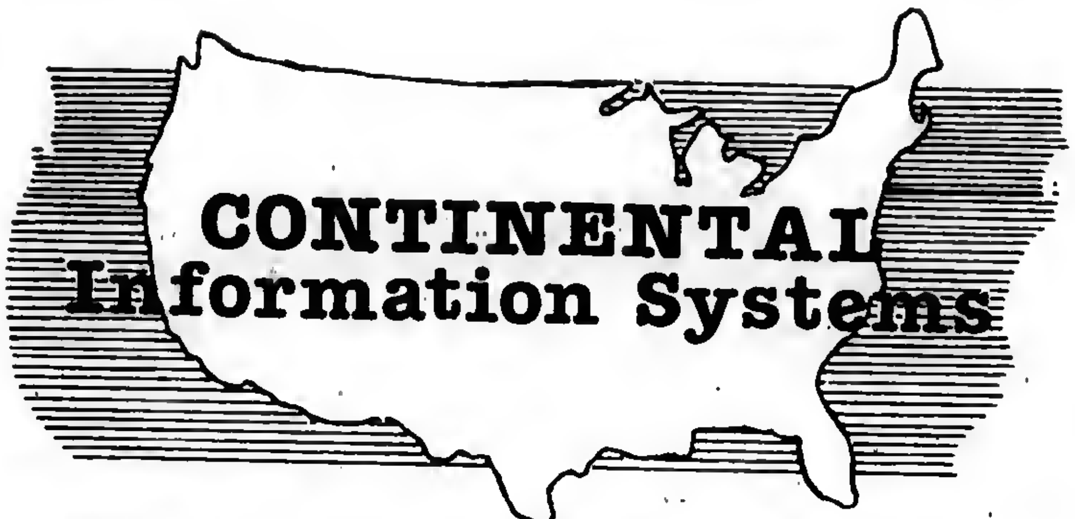

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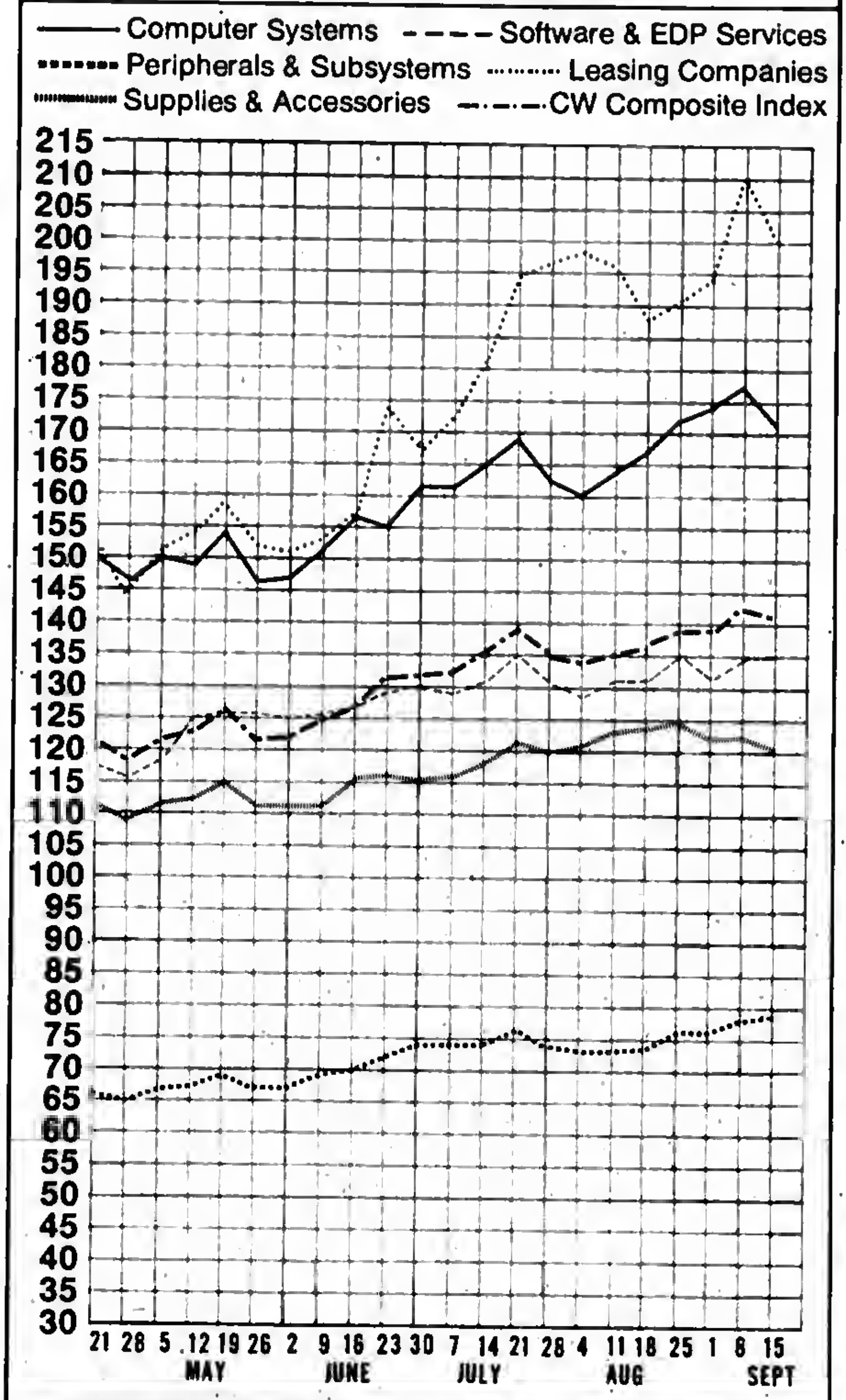

Earnings Reports

ELECTRONIC TABULATING
Six Months Ended June 30

	1977	1976
Shr Ernd	$.01	$.51
Revenue	1,765,071	1,743,728
Earnings	2,427	218,728

EMERSON ELECTRIC
Three Months Ended June 30

	1977 (000)	a1976 (000)
Shr Ernd	$.65	$.54
Revenue	478,483	385,408
Earnings	37,544	31,008
9 Mo Shr	1.84	1.54
Revenue	1,337,038	1,127,805
Earnings	105,881	88,802

e-Restated for acquisition of companies on pooling-of-interests basis and for change in accounting for foreign currency translations.

E-SYSTEMS
Three Months Ended June 30

	1977	1976
Shr Ernd	$1.78	a$1.13
Revenue	87,842,000	72,757,000
Earnings	4,668,000	3,112,000
6 Mo Shr	3.40	a2.04
Revenue	176,802,000	142,255,000
Earnings	8,128,000	5,582,000

a-Adjusted for 10% stock dividend in October 1976.

FOUR-PHASE SYSTEMS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.62	$.81
Revenue	21,014,000	15,037,000
Tax Cred	782,000	717,000
Earnings	2,510,000	1,728,000
6 Mo Shr	1.20	1.21
Revenue	38,812,000	28,727,000
Tax Cred	1,527,000	1,338,000
Earnings	4,844,000	3,225,000

FOXBORO
Three Months Ended June 30

	1977	1976
Shr Ernd	$1.57	$1.41
Revenue	80,773,000	82,967,000
Earnings	8,382,000	7,388,000
6 Mo Shr	2.82	2.47
Revenue	170,498,000	157,430,000
Earnings	15,041,000	12,882,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 14, 1977

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	40	-2	-4.7
N	BURROUGHS CORP	55- 91	69 3/4	- 3/4	-1.0
O	COMPUTER AUTOMATION	18- 30	27 1/4	-1 1/8	-3.9
N	CONTROL DATA CORP	20- 26	20 1/2	- 5/8	-2.9
O	CRAY RESEARCH INC	15- 29	26	-2 3/4	-9.5
N	DATA GENERAL CORP	35- 51	47 1/4	-1 3/8	-2.8
N	DATAPOINT CORP	18- 32	30 7/8	- 5/8	-1.9
N	DIGITAL EQUIPMENT	37- 53	46 3/8	-1 3/4	-3.6
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	9 3/4	- 7/8	-8.2
O	FOUR-PHASE SYSTEMS	13- 19	18 3/8	- 3/8	-2.0
N	FOXBORO	42- 54	46	-1 7/8	-3.9
O	GENERAL AUTOMATION	6- 9	7 1/8	- 3/8	-5.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	78 1/2	-1 1/2	-1.8
N	HONEYWELL INC	44- 55	46 5/8	-1 5/8	-3.3
N	IBM	245-286	263 1/8	-4 3/4	-1.7
O	MANAGEMENT ASSIST	5- 9	7	- 1/4	-3.4
O	MEMOREX	23- 34	31 1/4	-2 1/2	-7.4
O	MICRODATA CORP	7- 18	13 3/8	- 1/4	-1.8
O	MODULAR COMPUTER SYS	5- 9	6 7/8	- 5/8	-8.3
N	NCR	32- 47	45	0	0.0
O	PRIME COMPUTER INC	12- 23	21 7/8	- 1/8	-0.5
N	PERKIN-ELMER	17- 22	20	- 5/8	-3.0
N	RAYTHEON CO	16- 33	31	+1 1/4	+4.2
N	SPERRY RAND	34- 42	34 1/2	-1 3/8	-3.8
O	SYCOR INC	8- 15	11 5/8	+ 3/8	+3.3
A	SYSTEMS ENG. LABS	5- 8	6 3/4	- 5/8	-8.4
A	WANG LABS.	10- 14	13 3/8	- 3/8	-2.7

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	+ 1/4	+5.8
O	BOOTHE COURIER CORP	8- 10	10 3/4	- 5/8	-5.4
O	COMDISCO INC	10- 13	12	+ 1/2	+4.3
A	COMMERCE GROUP CORP	2- 2	1 1/4	- 5/8	-33.3
A	COMPUTER INVSTRS GRP	1- 2	1	- 1/8	-11.1
N	DATRONIC RENTAL	0- 2	1	- 1/8	-11.1
A	DCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	6- 9	9	0	0.0
N	ITEL	13- 22	20 1/8	- 3/4	-3.5
N	LEASCO CORP	19- 27	23 1/2	-1	-4.0
O	LEASPAC CORP	1- 2	1 3/4	0	0.0
O	MRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 1/2	- 1/4	-4.3
N	U.S. LEASING	10- 15	14	- 1/4	-1.7

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 3/8	- 1/8	-1.4
A	APPLIED DATA RES.	5- 10	7 5/8	- 1/8	-1.6
N	AUTOMATIC DATA PROC	23- 30	25 3/4	-1	-3.7
O	COLEMAN AMERICAN COS	2- 2	2 1/8	+ 1/8	+6.2
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 10	9	- 1/8	-1.3
N	COMPUTER SCIENCES	7- 9	8 7/8	- 1/4	-2.7
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 1/4	- 1/8	-9.0
O	COMSHARE	5- 7	7	+ 3/4	+12.0
O	DATA DIMENSIONS INC	3- 5	3 3/8	- 1/4	-6.8
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17 1/8	- 1/4	-1.4
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4	0	0.0
O	KEYDATA CORP	2- 3	2 3/8	- 1/8	-5.0
A	LOGICON	7- 17	12 1/2	+ 1/4	+2.0
A	MANAGEMENT DATA	1- 2	2	0	0.0
A	NATIONAL CSS INC	19- 26	24	- 3/8	-1.5
O	NATIONAL DATA CORP	4- 7	6 3/4	+ 1/8	+1.8
A	ON LINE SYSTEMS INC	17- 22	16 1/2	- 1/2	-2.9
N	PLANNING RESEARCH	3- 6	5 1/8	- 1/4	-4.6
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 5/8	0	0.0
O	REYNOLDS & REYNOLDS	17- 20	19 1/2	+ 3/4	+4.0
O	SCIENTIFIC COMPUTERS	1- 4	4 3/8	+ 1/8	+2.9
O	TYMSHARE INC	14- 23	20 1/4	-1	-4.7
A	URS SYSTEMS	4- 5	4 3/8	0	0.0
N	WYLY CORP.	1- 2	7/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/4	-1 1/8	-7.8
O	ADVANCED MEMORY SYS	7- 9	7 3/8	0	0.0
N	AMPEX CORP	8- 11	10 3/8	- 1/4	-2.3
O	ANDERSON JACOBSON	3- 5	3 1/2	- 1/4	-6.6
N	APPLIED DIG DATA SYS	10- 20	17 3/8	- 3/8	-2.1
O	BEEHIVE INT'L	8- 12	9 3/4	- 1/8	-1.2
A	BOLT,BERANEK & NEW	7- 8	7 1/2	+ 1/4	+3.4
N	BUNKER-RAMO	8- 12	11	- 1/4	-2.2
A	CALCOMP	3- 5	3	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	4	+ 3/8	+12.2
N	CENTRONICS DATA COMP	22- 30	28 5/8	-1 1/4	-4.1
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 7	7 5/8	- 3/8	-4.6
O	COMPUTER CONSOLES	4- 7	4 1/8	- 1/8	-2.9
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	10 1/4	- 1/8	-1.2
N	CONRAC CORP	19- 28	22	- 1/4	-1.1
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	8 1/8	+ 1/2	+6.5
A	DATA PRODUCTS CORP	9- 16	15	+ 5/8	+4.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2	+ 3/8	+23.0
O	DECISION DATA COMPUT	2- 3	2 1/2	+ 1/8	+5.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7	- 3/8	-5.0
O	DATARAM CORP	2- 8	7 3/4	- 1/4	-3.1
N	ELECTRONIC M & M	4- 5	3 7/8	- 1/4	-6.0
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	+ 1/8	+11.1
N	HAZELTINE CORP	9- 12	8 3/4	+ 1/4	+2.9
N	HARRIS CORP	28- 39	36	-1 5/8	-4.3
A	INCOTERM CORP	10- 15	12	- 1/8	-1.0
O	INFOREX INC	4- 7	4 3/8	- 5/8	-12.5
O	INFORMATION INTL INC	9- 14	11	- 1/4	-2.2
O	INTEL CORP	38- 57	45 1/2	-1	-2.1
A	LUNDY ELECTRONICS	3- 6	4	- 1/4	-5.8
O	MSI DATA CORP	6- 12	11 1/8	- 3/8	-3.2
N	MOHAWK DATA SCI	5- 8	6 1/8	- 3/8	-5.7
O	PENRIL CORP	2- 5	3 7/8	0	0.0
A	PERTEC CORP	7- 9	9 1/8	- 1/4	-2.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 1/2	- 1/4	-6.6
O	RECOGNITION EQUIP	6- 10	8 3/8	- 1/2	-5.6
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 16	15 3/8	0	0.0
O	T BAR INC	7- 13	12 7/8	+1	+8.4
O	TALLY CORP.	4- 6	4 5/8	+ 1/8	+2.7
A	TEC INC	7- 10	7 1/2	- 1/2	-6.2
N	TEKTRONIX INC	29- 38	37 1/2	+ 1/2	+1.3
N	TELEX	2- 3	2 5/8	- 1/8	-4.5
O	WILTEK INC	1- 1	3/4	+ 1/8	+20.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	8 3/8	+ 1/8	+2.0
O	BALTIMORE BUS FORMS	2- 4	1 5/8	- 3/8	-18.7
A	BARRY WRIGHT	10- 14	12 7/8	- 3/4	-5.5
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 1/4	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 7/8	- 1/4	-4.0
O	GRAHAM MAGNETICS	11- 17	16 5/8	0	0.0
O	GRAPHIC CONTROLS	15- 18	15 1/2	0	0.0
N	3M COMPANY	48- 56	51	-1 5/8	-3.0
O	MOORE CORP LTD	26- 37	27 1/2	- 1/2	-1.7
N	NASHUA CORP	16- 27	25 3/4	+ 3/8	+1.4
O	STANDARD REGISTER	18- 25	20	-1	-4.7
O	TAB PRODUCTS CO	13- 19	16	0	0.0
N	UARCO	19- 22	19 3/8	+ 1/2	+2.6
A	WABASH MAGNETICS	10- 15	12 5/8	+ 1/8	+1.0
N	WALLACE BUS FORMS	17- 21	18	- 1/4	-1.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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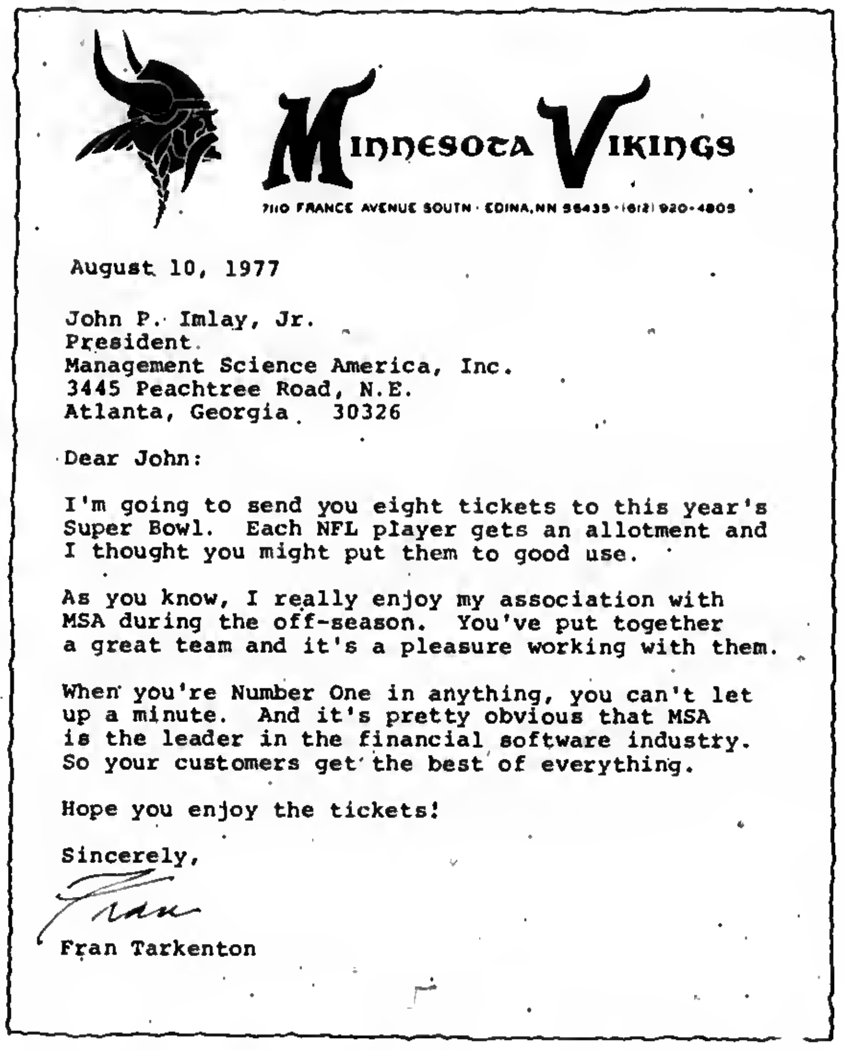
Enter MSA's "Super Pool" and win a free trip to the Super Bowl. Free airline fare, free accommodations at one of New Orleans' luxurious hotels, and free tickets to the biggest game of the year, courtesy of Fran Tarkenton and MSA.

New Orleans



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August 10, 1977

John P. Imlay, Jr.
President
Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

Dear John:

I'm going to send you eight tickets to this year's Super Bowl. Each NFL player gets an allotment and I thought you might put them to good use.

As you know, I really enjoy my association with MSA during the off-season. You've put together a great team and it's a pleasure working with them.

When you're Number One in anything, you can't let up a minute. And it's pretty obvious that MSA is the leader in the financial software industry. So your customers get the best of everything.

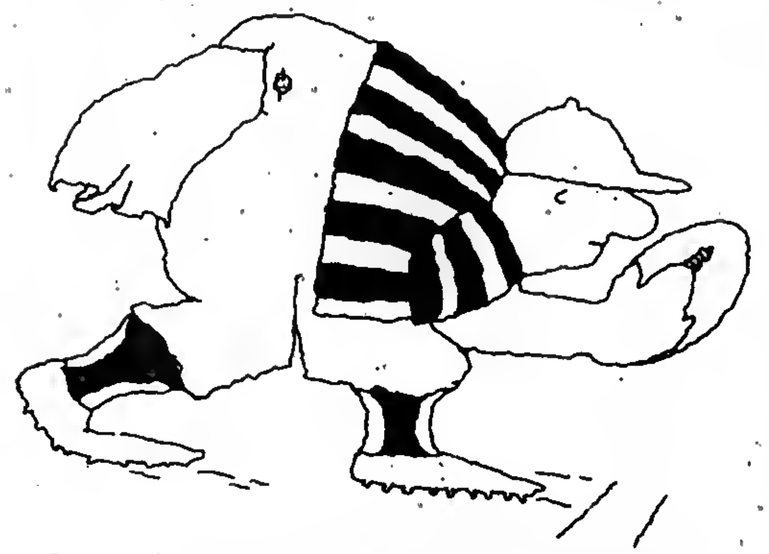
Hope you enjoy the tickets!

Sincerely,

Fran

Fran Tarkenton

All you do is peer into the future and pick the winning team of each upcoming NFL Monday Nite Football game (plus one extra game to make things even), plus a tie breaker for the season. All are ABC televised games.



Circle the winners, do not pick ties, clip the entry blank and send to MSA Super Pool, 3445 Peachtree Rd., N.E., Atlanta, Georgia 30326.

"That's all there is to it."

Circle the Winning Team for Each Game.

Oct. 3	Oakland	at Kansas City
Oct. 10	Los Angeles	at Chicago
Oct. 17	Cincinnati	at Pittsburgh
Oct. 24	Minnesota	at Los Angeles
Oct. 31	N.Y. Giants	at St. Louis
Nov. 7	Washington	at Baltimore
Nov. 14	St. Louis	at Dallas
Nov. 21	Green Bay	at Washington
Nov. 28	Buffalo	at Oakland
Dec. 5	Baltimore	at Miami
Dec. 12	Dallas	at San Francisco
Dec. 17	Minnesota	at Detroit

Tie Breaker:

The team scoring the most points in any one of these games will be ________ (Team).

The game in which the most points will be scored will be ________ (Date of Game).

The number of points scored will be ____ (Number).

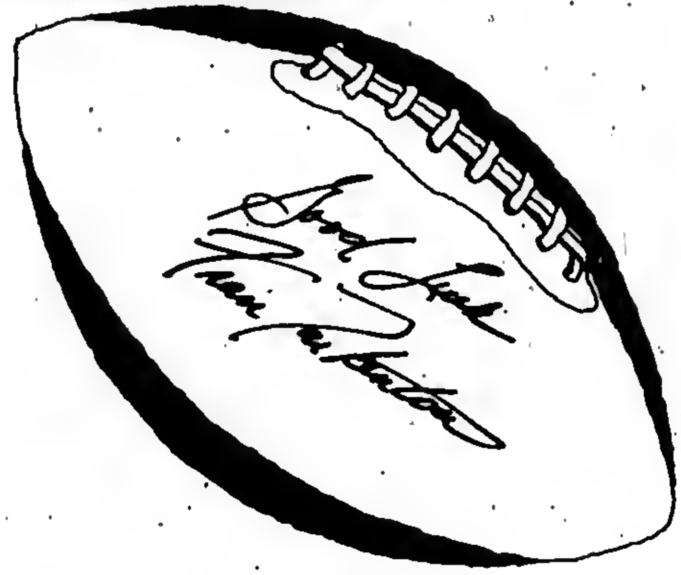
Send this entry blank to:
MSA Super Pool
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

Please Print

Name ________________
Title ________________
Company ________________
Address ________________
City ________ State ________ Zip ________
Telephone ________________

Void where prohibited by law.

There will be one winner of a Super Bowl Trip for four, two winners of a trip for two, and twenty third place winners who will each receive a leather exhibition football, autographed by Fran Tarkenton.



Entries must be postmarked no later than Sept. 30. Facsimiles of the entry blank are acceptable, however, only one entry per person. An independent judging firm will announce the winners in late December.

1978
SUPER
BOWL

So get busy, sports fans. Make your selections and send them in. Someone will win these glorious, fun-filled Super Bowl trips to New Orleans next January, and it could be you!

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Survey Finds Users Slow To Adopt DDP

Many users of large IBM computers think and talk a lot about distributed processing, but relatively few have done much about it, a *Computerworld* survey of 20 370/168 and 370/158 users has found.

Seventy percent of the users surveyed reported that they had considered implementing a distributed processing system, but only nine of the respondents said they had already installed such a network or planned to do so soon.

And of the nine systems labeled as distributed, three proved to be centralized data bases that had been divided among several sites. So users of truly distributed processing systems accounted for only six respondents, or 30% of the survey population.

In other findings, the survey revealed that only 20% of the users contacted plan to split their data bases among several remote locations, while 35% definitely had decided against that option. The remaining 45% either declined to discuss the specifics of their distributed processing plans or confessed they were not privy to their companies' long-term DP policy.

This is the second article in a three-part survey of users' attitudes toward alternative CPUs, distributed processing and IBM's Systems Network Architecture (SNA) by Jeffry Beeler, Ronald A. Frank and Molly Upton.

The survey also found that exactly half the users intend to install a terminal-based system, if they have not done so already, and that 35% plan to acquire at least one minicomputer-based system.

(Continued on Page 4)

NEWSPAPER

COMPUTERWORLD
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Burroughs Unit Speeds Running Fortran Code

By Frank Vaughan
CW Staff

DETROIT — The Burroughs Corp. here has introduced an Attached Fortran Processor (AFP) that can reportedly sustain a computing rate of up to 1.5 million floating point operations per second.

The AFP can be installed on any Burroughs B6700, B6800, B7700 or B7800 general-purpose systems, according to a spokesman, who noted that the AFP can execute Fortran programs at up to 10 times the speed of the B6807 large-scale system.

The AFP serves as a mathematical program-oriented subsystem to the companion Burroughs system, which acts as the AFP's system manager.

Operating under a new release of the Master Control Program (MCP), the system manager provides a control environment for the attached processor and at the same time performs the user's business-related DP tasks, which may include on-line and real-time operations.

The spokesman estimated that between 10% and 15% of the capacity of a 6000 series system is utilized managing the AFP, leaving the remaining 85% to 90% of system capability for other work.

The system manager also compiles Fortran application programs, schedules jobs for the AFP to run, provides data I/O, controls peripherals and permanent storage devices, monitors errors and performs on-line diagnostics.

The Fortran processor itself operates at 12.5MHz, and the spokesman noted that the system's processing speed can be attributed not only to the speed of the processor but to the AFP's local buffering. It also does some look-ahead before the actual operation of an

(Continued on Page 7)

Annual Survey Indicates

DP Salaries Up; Increases Slowing

By Ann Dooley
CW Staff

LAKE, BLUFF, Ill. — Although the economy was looking brighter, DP salaries rose more slowly this year than they did in 1975-1976, according to the annual *Hansen's Weber Salary Survey*.

Salaries grew at 5.1% this year compared with a 5.7% rate last year, the report said.

Top DP managers fared the best in salary hikes, experiencing an 11.2% increase amounting to an average salary of $36,036 nationally.

The highest paid person in that job category earned $86,084 this year, whereas five years ago the top salary was $46,176.

The salary statistics for the Hansen survey cover June 1976 to June 1977 and include 1,157 DP installations; 75 different cities and salary rates of 88,166 employees.

Nationally, systems analysts received a 6.2% increase based on six levels within the systems analyst job function as defined by the Hansen survey. The levels include manager, lead systems analyst, senior systems analyst and levels A, B and C.

The senior level systems analyst earned a 6% increase for an average yearly salary of $20,384. The entry level position (C) had a 4.5% increase, earning an average salary of $12,584 annually.

The senior applications programmer earned a 5% increase, receiving an average salary of $17,524 nationally, while the entry level position in that same function stayed at the same level as last year. The entry level salary is $11,076 nationally, which was an average increase of only two dollars a year, according to Sandra Green, compensation survey coordinator.

The average nationwide increase for all six levels of applications programmer amounted to 4.6%, according to the survey.

Computer operators on the senior

(Continued on Page 2)

Kreps Considering IBMer For Post in Revamped OTP

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Still another attorney with an IBM connection is being considered for a top-level position in the Carter Administration.

Anne W. Branscomb, vice-president of Kalba-Bowen Associates — consultants in telecommunications, is one of five candidates for the new position of Assistant Secretary of Commerce for Communication and Information, created out of the President's reorganization of the Office of Telecommunications Policy (OTP). She is also the wife of Dr. Lewis M. Branscomb, vice-president and chief scientist of IBM.

If selected by Commerce Secretary Juanita Kreps to be recommended to the President for the communication and information policy job, Branscomb would join several other key federal government officials who have been linked to the corporation, including Secretary of State Cyrus Vance, Secretary of Housing and Urban Development Patricia Harris, Secretary of Defense Harold Brown and Attorney General Griffin Bell.

Branscomb, who attended George Washington University's law school and was admitted to the bar in 1962, was among five people included in a group interview conducted here re-

(Continued on Page 6)

Jury Verdict Directs IBM To Pay Forro $2.7 Million

By Molly Upton
CW Staff

SAN FRANCISCO — A five-woman, one-man jury has ordered IBM to pay Forro Precision, Inc. $2.7 million in a verdict on Forro's charges that IBM interfered with its components business.

The jury failed to reach a verdict on the antitrust charges pressed by Forro. It did, however, order Forro to pay IBM $260,777 on a counterclaim alleging misappropriation of trade secrets.

Both sides indicated they plan appeals and motions on the findings.

In awarding Forro the $2.7 million, the jury considered seven counts pertaining to how IBM interfered with Forro's business.

The complaint said IBM, in violation of a protective order, made available to Forro customers and to the San Jose, Calif., police information contained in the depositions of Forro employees and Forro documents produced for the IBM vs. Memorex case.

Furthermore, Forro alleged, IBM approached various law enforcement agencies and officials asking them to

(Continued on Page 6)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Salary Increases Slowing Down: Survey

(Continued from Page 1)

level had a 7.5% salary increase, earning an average $12,792 nationally. At the entry level; the salary average drops to $8,320 with no percentage increase large enough to be calculated in the survey.

Further Breakdown

In addition to salary breakdown by DP position, the Hansen survey also examines wage increases by size of installation, type of city and industry.

Installation size is based on the monthly rental of equipment hardware. A Size One site spends up to $12,000 a month on rental equipment, Size Two spends $12,000 to $25,000. Size Three spends $25,000 to $50,000, Size Four spends $50,000 to $150,000 and Size Five spends over $150,000 on hardware.

The size of the installation is correlated to a city level which consists of a number of cities with similar characteristics. Of the five city levels used in the survey, Chicago is calculated as the base number and all other cities are compared with it.

For instance, Chicago is rated as a Level Two city based on its cost of living, salary index and nomerous other factors. New York is a Level One city, Denver is a Level Three, Jacksonville, Fla., is a Level Four and Des Moines, Iowa is a Level Five city.

Correlating installation size with a Level Two city, a top DP manager there earns $30,056 in a Size One installation, $32,760 in a Size Two, $34,320 in a Size Three, $37,024 in a Size Four and $43,316 in a Size Five installation.

For the top manager, a definite correlation appears between installation size and salary.

In the case of a senior systems analyst, however, installation size doesn't seem to mean as much. The average salary was found to be $19,396 in a Size One installation and a Level Two city, $21,476 for a Size Two installation, $20,800 for a Size Three, $21,268 for Size Four and $20,280 for a Size Five installation.

The senior applications programmer in a Size One installation in a Level Two city received $16,588 yearly, $18,824 in a Size Two installation, $17,836 in a Size Three, $18,616 in a Size Four and $18,616 in a Size-Five installation.

A senior computer operator for a Level Two city and a Size One installation received $11,544 yearly, $12,948 in a Size Two, $12,688 in a Size Three, $13,104 in a Size Four and $13,988 in a Size Five installation, according to the survey.

Installation Size

The figures indicate that salary was correlated to the installation size for the top manager and for the computer operator, although less significantly. For the programmers and systems analysts, installation size was not important to their wages.

The size of the installation might prove important in a top DP management position, because job competition is usually from a nationwide market. While this is not true of computer operators who are drawn from a local market, the size of the installation could prove important because operators must have more knowledge and sophistication to work in a correspondingly more sophisticated DP environment and their salaries would rise with their skills, the survey said.

Analysts and programmers are also taken from a local market, but their job function and level of sophistication might be incidental to the size of the installation, according to Green.

The survey also covers 10 types of industries including manufacturing, transportation, communication, utilities, wholesale trade, retail trade, finance, insurance and real estate, services and government.

Looking at the manufacturing figures from a Level Two city, the top DP manager in manufacturing earned $38,012, in finance the manager earned a yearly salary of $33,228 and in government he earned $42,068.

The senior systems analyst earned an average of $21,892 yearly in manufacturing, a salary of $19,708 in finance and $22,568 in a government DP installation.

The senior applications programmer who is in manufacturing in a Level Two city earned $18,408 on a yearly average, $17,056 in finance and $20,280 in government.

The senior manufacturing computer operator earned $13,156 yearly, in finance $12,532 and in government $15,756.

The survey indicated that some cities experienced higher-than-average increases such as Dallas which was up 9.4%, Houston up 9.9%, Denver up 7.4% and St. Louis up 7.6%.

Large northern cities such as Chicago and New York experienced lower wage increases than the national average, the survey determined.

Possible explanations for the low gain could be that the DP employees in large installations found in those cities move rapidly through the levels of their job in a large DP installation. They don't stay at one level long enough to gain an increases at that level before moving on to the next, Green hypothesized.

The Hansen survey also indicates that the trend of companies to move to the sunbelt might have created a supply-and-demand problem for those DP people who refused to relocate. Those extra people might have had something to do with bringing the figures down, Green suggested.

But it is too soon to determine accurately the reasons for the low increases in the north, she said.

In addition, the reason for the large increase in salaries might be that the South has never had to pay the premium wages that the Northeast, Midwest and California do. Those areas have a high cost of living and a high level of DP sophistication. Given a few more years, the salary statistics might equalize somewhat, Green predicted.

The 1977 Hansen survey can be purchased for $95 from A.S. Hansen, Inc. at 1080 Green Bay Road, Lake Bluff, Ill. 60044.

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A CW Special Report on "Stretching the DP Dollar" follows Page 48.

MUSCLE

Sure, MVS gives you more power. But watch out for sorting charley horses!

(SyncSort's preferable to liniment.)

Call (201) 568-9700.

Get into shape with a free sorting survey.

Do you ever get the feeling that the Computer Giant would like to see *everybody* go to MVS?

We do. Particularly when we read ads like "MVS: Real Muscle for Large Systems," which appeared in a recent DP Dialogue. The lead paragraph went like this:

> "Processing a complex job stream makes unique demands on operating system software. And in a communications-oriented environment, the system must be able to handle large volumes of work in an unpredictable mix of batch tasks and terminal transactions."

So far, so good. MVS *is* a powerful tool in multi-programming, and heaven knows we have nothing against it. Some of our best friends use it. (In fact, *more than half* of all MVS users sort with SyncSort.)

But you have to be careful of software programs that don't fit into multi-programming. Otherwise you may end up with a painful charley horse in all that new muscle.

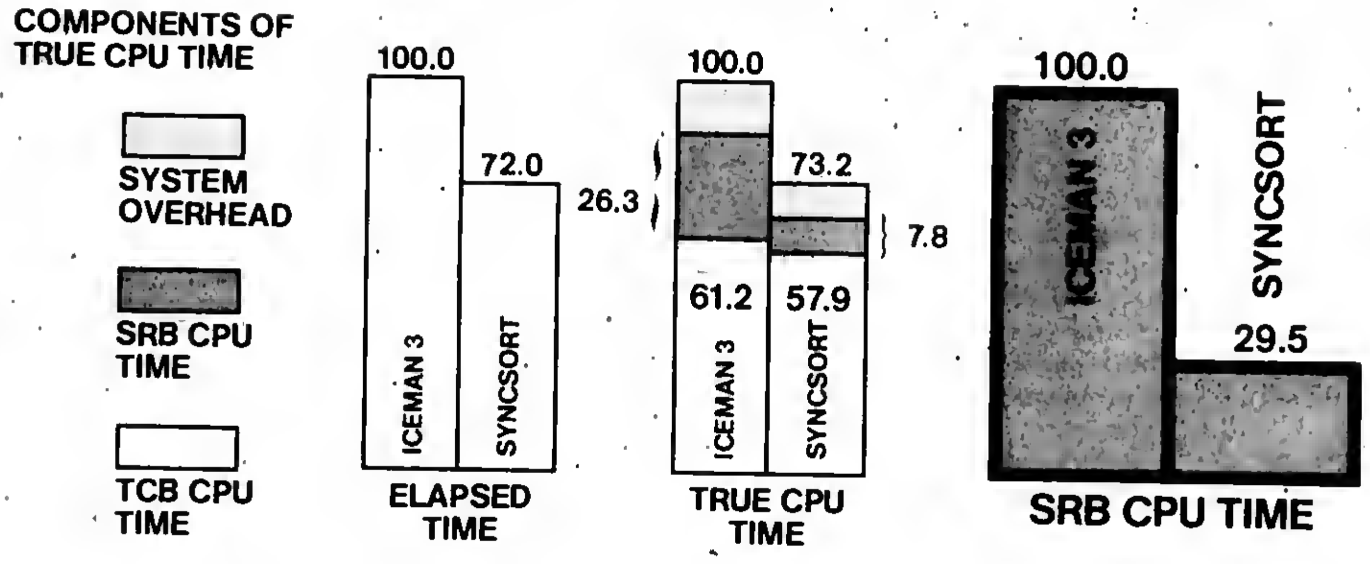
Take sorting operations, for example. They represent a big chunk of those "large volumes of work in an unpredictable mix." In fact, your MVS system may spend 20 or more percent of its time doing *nothing* but sorting.

If you happen to sort with SyncSort III-and-a-half, you're going to have no problems whatever. It's a natural for busy, multi-programming operations. But if you happen to have chosen the Computer Giant's 5740-SM1, Release 3, look out for "locked up" CPU time.

In MVS, there are two components of True CPU Time, apart from systems overhead. They are:

- TCB Time (Task Control Blocks) — which is *interruptible*. If the CPU wants to switch signals and run another job, the message gets through.
- SRB Time (Service Request Blocks) — which is *non-interruptible*. The line is *always* busy. And this directly affects the performance of other jobs in a multi-programming mix.

Take a look at the charts below. They compare SyncSort's overall MVS performance with IBM's 5740-SM1, Release 3. And the two on the right pinpoint the SRB Time differences.



No matter what system you use, SyncSort will give you major savings in computer resources. But it's particularly useful in multi-programming, where that "go to jail" time is reduced by a whopping 70%.

We call it "time off for good sorting behavior."

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Survey Finds Users Not Rushing to Use DDP

(Continued from Page 1)

The most frequently cited reason for not considering distributed processing was satisfaction with existing computer configurations or fear that a hardware change might disrupt long-standing operations. Five respondents used those or similar arguments to justify their preference for centralized data bases.

Thus far, only one of the users interviewed has rejected distributed processing outright after thoroughly evaluating the alternative. Four other users, however, are undecided about the approach, either because they suspect that distributed processing will clash with their existing procedures or because their DP plans are still in the formative stage.

A case in point is the Aluminum Co. of America (Alcoa). There, officials have long considered installing a distributed processing system, but thus far they have remained unconvinced of its value, according to technical services manager R.N. Wehling. If the Pittsburgh firm ever did acquire a distributed processing system, it would probably consist of a central minicomputer linked to 23 remote terminals, he said.

Chase's Schemes

In contrast to Alcoa's cautious and deliberate pace of development, the Chase Manhattan Bank's Trust Department has already implemented two distributed processing schemes. One of these schemes is a communications network based on the department's central 370/168.

The other uses stand-alone minis with little or no communications capability, senior vice-president William Shine said. Those minis include a DEC PDP-11/35, a General Automation, Inc. 3000, a Singer Business Machines Model 10 and several intelligent terminals.

Compared to Chase Manhattan, Blue Cross/Blue Shield's computer center in Richmond, Va., has made less of a commitment thus far to distributed processing, but the health insurance organization has already begun formulating plans to implement a distributed system, according to operations manager Leo Harris.

When fully installed, the distributed processing network will off-load localized data bases and allow remote offices to enter data into Blue Cross/Blue Shield's 370/158 central computer. The proposed network will be based on both terminals and minicomputers, Harris predicted.

Firestone Switching

Firestone Tire & Rubber Co. is also in the process of switching to a distributed processing system, H.W. Guthrie, the firm's operations manager, said. In that system, Data 100 terminals (models yet undecided) will link to a central 370/168 and 370/158 at the company's DP center in Akron, Ohio.

Among its other distributed processing plans, the firm will split its data base and install both a terminal-based and a minicomputer-based system.

Hallmark Cards, Inc. regards distributed processing and a move to IBM's Systems Network Architecture (SNA) as part of the same potential systems upgrade, Ron Schmidt, the firm's senior technical services analyst, explained.

Early next year, the Kansas City company plans to install an IBM 3705 with a 3790 remote terminal system. At first, the firm will test the 3790 alongside its central 370/168s, but if the results prove positive, Hallmark will place additional terminal systems, Schmidt said.

Northwestern Mutual Life Insurance Co. is another of the survey respondents that has already created a distributed processing system. Jeff Dunn, the firm's assistant DP director, said the system consists basically of Texas Instruments DX-20 minicomputer terminals that connect all the company's remote locations to its central 370/168 in Milwaukee.

Separate Data Bases

Prudential Insurance Co. of America maintains several computer sites and has distributed some of its computing power to each of those locations, according to shift supervisor Mike Capo.

Rather than split its data base among several sites, the Roseland, N.J., firm operates a separate data base for each of its computing applications, Capo added.

Sears Roebuck Co. uses distributed processing only on a "very limited" scale at its Philadelphia computing center, data center manager Ronald Leone explained.

In fact, that system is confined to one building, where a series of remote minicomputers links several of the company's administrative departments to a central 370/158. At its Chicago headquarters, however, Sears is further exploring distributed processing techniques in research and development projects, Leone said.

A distributed processing system of sorts also is operating out of Amoco Production Co.'s computing center in Tulsa, Okla., according to operations manager William Caldwell. That system, however, consists primarily of large mainframes — a 370/168 in Tulsa and a 370/145 plus a 370/148 at its Chicago office, he explained.

Others Less Developed

Compared to companies like Amoco, however, many other 370/158 and 370/168 users are much less developed in their distributed processing capability. In Akron, Ohio, for example, Goodyear Tire & Rubber Co. has considered distributing its computing power to various sites, but the company has not yet formally committed itself to that approach, according to John Longstreth, manager of data processing support services.

Ford Motor Co.'s computing center in Dearborn, Mich., is also evaluating the potential of distributed processing, equipment manager Roger Bisschop said.

The Ford DP center, which acts as a service bureau for several departments within the company, has assigned a task force to assess the feasibiity of complementing its existing computer hardware with a second processing center, Bisschop explained.

"Before we can think about dual sites, we have to be sure we can continue to provide the current functions to our users," he said. Ford's computing center houses seven IBM mainframes, including a 370/168 and a 370/165, plus two Burroughs CPUs.

Evaluation of distributed processing possibilities likewise continues at Sun Oil Co.'s Information Services Division, but as with Ford, the Tulsa, Okla.-based company has formulated no firm plans, according to Bill Fore, a manager of Sunoco's technical staff group.

Two 370/168s and several 360/30s run under RJE at the company's cen-

(Continued on Page 7)

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'Not a Technical Problem'

Distributed DP Seen Efficient Business Tactic

By Toni Wiseman
CW Staff

Business is most efficiently conducted through decentralization, and distribution of computer resources is not only desirable, but also possible and probably inevitable, according to speakers at the Western Electronic Show and Convention (Wescon 77) here last week.

A session on the meaning and impact of distributed processing began with a formal definition of the term: "Distributed processing is an umbrella term for a variety of processing structures whose common goal is the placement of local computer power at the disposal of every unit of the business for the purpose of enhancing each unit's operations and controlling a timely flow of intelligence among these units."

While advocating the move to decentralization, speakers agreed it is not an easy task to accomplish, particularly since the investment in a centralized facility is usually large. In addition, disturbing the calm of the "old regime" may be disastrous.

Jacob Sternberg of Conversational Systems Corp. pointed out the move to distributed processing is not a technical problem. "Once management decides where computer power assistance is required, the technologist can supply that power in a variety of forms," he said.

Sternberg backed up his optimistic statement with several observations.

First, minis and micros are now highly reliable and the concern technologists once had regarding placing hardware in the boondocks is slowly becoming a moot issue.

Further, the small boxes are as intelligent or as dumb as required and local customization can be easily accomplished through hardware or software.

In addition, hardware interfaces, controllers, peripherals and communications devices all have sufficient intelligence to enable timely hook-ups of plug-to-plug compatible hardware, he stated.

Compatibility Goal

The plug-to-plug compatibility goal for both hardware and software enables capitalizing on the coming technical breakthroughs in mass memories, communications and other peripherals.

Plug-to-plug compatible software can be attained. Sternberg added that while current software costs of over $4.50 per documented instruction are ridiculously high, the cost stems from the complexity of the designs and from excessive documentation requirements.

"Specific software is easier to write and document;" Sternberg said. "Interfaces between software modules can be created to replace the overhead burden inherent in the complex and general software currently in use," he said.

Taking a look at the question from management's point of view, Sternberg said it should be reassured by the commitments being made by large manufacturers, led by IBM, and by the fact that "pioneering" is no longer required since a large number of successful implementations already exist..

Patrick LaMalva of Citibank N.A. told the audience he was there to "debunk" a few myths about the firmly entrenched business axiom of "economy of scale."

Citibank, he noted, is opposed to the "conventional wisdoms" and believes in keeping operations on a small scale.

"Our concept of economy of scale in banking says operations should be a small unit — one person if possible — with a personal relationship with the customer," he said.

From a systems standpoint, the fundamental problem is the functional approach to systems development that prevails today, La Malva stated. This stems from the fact that most equipment manufacturers still look at functions individually and not as parts of a system, he added.

CW at Wescon

The primary example of this philosophy is the large, powerful multiprogramming computer that has been marketed as the answer to today's operating problems, he said.

This approach is machine-efficient and people-inefficient, he said, and in a people-intensive business such as banking, that adds up to substantial inefficiencies of cost.

"Because it is based on the principle of 'economy of scale,' this approach militates against the ability of the manager to solve the small-scale problems," LaMalva charged. "And small-scale local, immediate problems are precisely what the business manager worries most about, and where most of his short-term cost and quality opportunities lie."

Finally, and perhaps most important, "This approach encourages — indeed demands — the optimization of specific functions at the expense of all other functions," LaMalva said.

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Kreps Eyes IBMer for Post in Revamped OTP

(Continued from Page 1)

cently by Kreps and Dr. Sidney Harman, deputy undersecretary of the Commerce Department, sources close to the selection process said.

All those interviewed are attorneys. They include Henry Geller, a Fellow at the Aspen Institute who used to be general counsel of the Federal Communications Commission (FCC); Nick Miller, now an OTP consultant, but formerly counsel for the Senate Commerce Committee; Henry M. (Chip) Sooshan III, presently counsel to the House Communications Subcommittee; and Frank Lloyd, recently an executive director of the Citizens Communications Center and now an OTP consultant, the sources added.

The post of assistant secretary for communication and information was created by the President's Reorganization Plan No. 1, which will go into effect, unless voted down by Congress, in mid-October. That same reorganization plan abolished OTP as a White House office and transferred many of its functions and staff to the Commerce Department.

The new office is a Presidential appointment and as such can only be made by Carter himself, a Commerce spokesman pointed out. The Senate must then confirm the appointment.

Carter, however, will probably rely on Kreps' recommendation, he added.

A government official involved in the assistant Commerce secretary selection process described Branscomb as "an attorney from Armonk and involved in broadcasting matters." Kalba/Bowen Associates is based in Cambridge, Mass.

Branscomb's husband, Lewis, served as head of the National Bureau of Standards in Commerce during the Nixon Administration.

Secretaries Vance, Harris and Brown have all served as directors of IBM's board. Attorney General Bell must disqualify himself from all Justice Department matters concerning IBM because the Atlanta law firm of which he was a partner represented the corporation on various occasions.

Kreps herself was rumored to have been recommended to Carter by IBM for the position of Commerce Secretary when Jane Cahill Pfeiffer, an IBM vice-president, dropped out of the running for that position last January.

IBM Ordered to Pay Forro

(Continued from Page 1)

conduct an investigation of Forro based on information IBM knew to be false.

In 1973, IBM, "acting together with others, seized [Forro's] business records, including confidential pricing information and blueprints, for the purpose and with the intent of destroying plaintiff's business and impeding and eliminating competition in peripheral devices and computer components . . .," Forro stated.

Between 1972 and 1976, IBM "knowingly made false statements of fact to police" and to the Santa Clara County district attorney "for the purpose of securing criminal indictments against certain of its competitors and to hide and obscure the unlawful relationship between IBM and said authorities," the Forro complaint continued.

Forro also charged IBM with misusing its subpoena power issued in IBM vs. Memorex to "intimidate, threaten and harass key employees of Forro [and] gain unlawful access to secret and proprietary documents and business information of Forro and others."

Forro sought a minimum of $220,000 in direct damages and $14 million in punitive damages for the common law counts. It also asked for $12 million under the antitrust charges.

IBM's counterclaim charged Forro, a maker of disk drive components, with misappropriation of trade secrets. IBM sought $5 million in damages and $20 million in punitive damages.

After assessing the verdict, Forro attorney Joseph M. Alioto said he plans to ask for a retrial on the antitrust grounds and the punitive damage claim. He also plans to ask that the jury's award to IBM be thrown out because "the evidence isn't there" for such a decision.

IBM plans to appeal the decision ordering it to pay Forro $2.7 million. IBM chairman Frank T. Cary said, "We are obviously disappointed that the jury didn't reach a decision on the antitrust charges, since we are confident of our position. It's difficult to understand the award to Forro since the 'interference' was related to a search of Forro's premises by the police with respect to IBM trade secrets. We intend to appeal."

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In Survey of Large IBM Installations

Users Found Slow to Move to Distributed DP

(Continued from Page 4)

tral computer site in Dallas, but Sunoco is not considering splitting its data base among several locations, Fore said.

The company expects its first terminal-based system, which it admits is still fairly primitive, to continue growing, and Sun is also putting the finishing touches on its own standalone minicomputer systems, the technical staff manager added.

In contrast to companies like Sunoco, several 370/158 and 370/168 users contacted during the survey expressed little or no interest in distributed processing. Oscar Mayer Co., for example, has declined even to consider a distributed processing system, Roger Tietz, the firm's computer manager, said.

Oscar Mayer has decided to retain its centralized data base because the Madison, Wis., company believes the relatively small volume of data it processes does not justify the changeover to distributed processing, Tietz explained.

Ashland Oil Co. also has chosen not to consider replacing its centralized data base with a distributed computing system. The Ashland, Ky., firm has concluded that decentralization would hamper its operations, according to Stan Wonn, the company's administrative assistant for computer services and sciences.

Not Much Headway

Nor has distributed processing made much headway at Ralston Purina Co. in St. Louis. Company officials have had little incentive to consider that option, primarily because they have found that their firm's current computing configuration, built around a 370/158 and 370/168, can meet all of Ralston Purina's DP requirements, according to Chuck Childers, general manager of computer services.

The Joseph Schlitz Brewing Co. flirted briefly with the idea of converting to a distributed processing system, but for the most part the company has rejected that approach, according to information processing manager R.L. Babcock.

The Milwaukee-based brewer has concluded that distributed procesing does not fit in with its existing operations or DP applications, Babcock added.

As an alternative to distributed processing, the company "does a lot of remote job entry," he said.

Bureaucratic reasons are primarily responsible for PPG Industries, Inc.'s decision not to consider switching from a centralized to a distributed computing system, according to D.L. Campbell, director of the company's computer center in Pittsburgh.

To make a change as drastic as the creation of a distributed processing system requires a central DP policy-making body, and PPG Industries lacks such a body, Campbell complained. Rather, the responsibility for creating the company's DP policy is divided among the managers of the firm's four corporate divisions.

Monsanto Co. in St. Louis credits its decision not to seriously evaluate distributed procesing to satisfaction with its existing centralized system, explained Frank X. Fallert, manager of performance analysis. That computing system consists basically of two major DP centers, one in the U.S. and the other in Europe.

The firm maintains a 370/158 and 370/165 that connect to interactive and RJE terminals, respectively.

Bud Patterson, a production manager with Union Carbide's Chemical Division in S. Charleston, W. Va., declined to comment on his firm's distributed processing plans. Such considerations are the concern of high management and beyond the scope of his responsibilities, he said.

Unit Processes Fortran Coding

(Continued from Page 1)

instruction, and instruction set is optimized for floating point operations, he added.

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Distributed DP No Longer Vague Concept for Malmo

By Esther Surden
CW Staff

MALMO, Sweden — For the third largest city in Sweden, distributed processing is no longer a nebulous concept — it is an already-implemented, cost-saving alternative to using large mainframes to process the city's applications.

And it's an alternative that when properly designed — with the end user in mind — reaps rewards in user satisfaction, according to Nils Dahlberg, the city's DP manager.

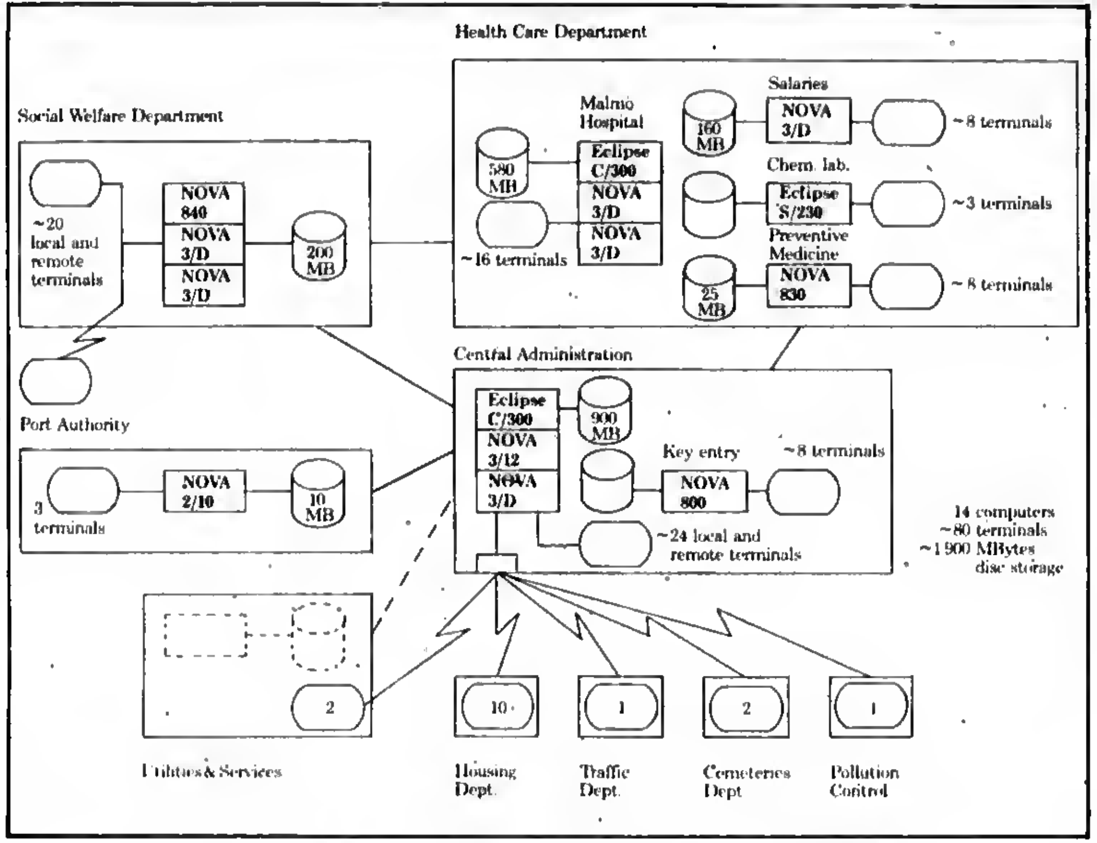
From its first brush with punch card equipment to the centralization of most of its applications on a mainframe, Malmo's DP history followed a traditional path.

By 1972 the city had large Datasaab systems and a centralized data base; all of its large applications were running in batch mode. In that year, the DP department decided to try to develop an interactive system, still using the large systems, for its social welfare application.

"We worked with the people in the field, we talked to the users and found that when we were finished there was much enthusiasm for what had been developed. It was no longer our system, it was their system," Dahlberg said in a recent interview.

The interactive processing created a heavy demand from users for more interactive processing, but Malmo's two large-scale systems had reached their limits.

The DP department calculated that in order to implement all the systems the city planned in interactive mode, a capacity of 130 transaction/sec was needed. No single system, large or small, could provide that capacity.



Malmo's system is based on 14 Data General minis.

The city then made some price/performance comparisons. For example, it found an IBM 370/148 with 2M bytes of memory and a capacity of 10 transaction/sec cost about 5 million kroner (one kroner equals about 23 cents), while a minicomputer with a capacity of 4 transaction/sec cost about 200,000 kroner. Thus it would take 13 large systems at about 65 million kroner to do the job that 32 minis could perform for 6.5 million kroner.

This CPU-to-CPU comparison came up with a 10:1 ratio in favor of minis, Dahlberg noted, and with the price/performance breakdown favoring the minis it was "easy to convince the city council" to give the go-ahead.

The manager estimated that when calculated on a system-by-system basis, the minis are 1.5 to 2.5 times more cost-effective than their batch counterparts.

"It took about two years to look at the mini market," Dahlberg recalled. "In 1974 no one was interested in interactive systems software development."

So the city looked for a company that could provide the tools it needed to develop the overall system. Data General Corp. could provide a multiprocessor communications adapter (MCA) as standard hardware.

The MCA allowed the DP department to link the minis.

All development work then stopped on the big systems and "during the next two years we worked on developing software for interactive processing." The city developed its own language with screen-handling techniques, communications routines, multiprogramming capability, Isam structure and multiterminal capability.

About 20% of the programming on the system is done in Fortran and the rest is done in the language the DP department developed.

Presently the city has 14 DG minis with about 80 terminals and disk storage totaling about 1.9G bytes. Ten different groups of users are running about 25 different applications.

Among the applications now tied into the distributed system are the Department of Social Welfare's system, which maintains waiting lists and books places in the city's nursery schools and old people's homes; the port authority system that bills harbor charges and performs all bookkeeping; the billing system for city's utilities; and the Department of Health's systems for patient administration and preventive medicine.

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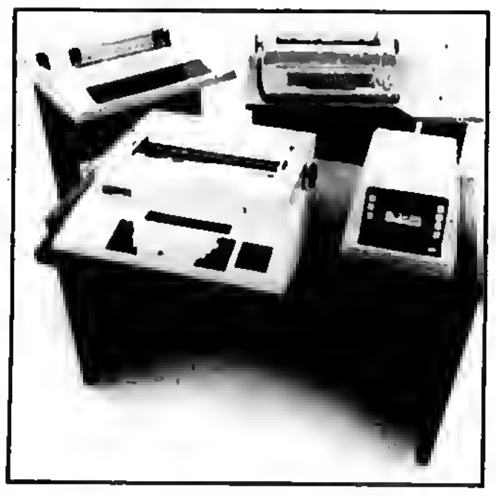

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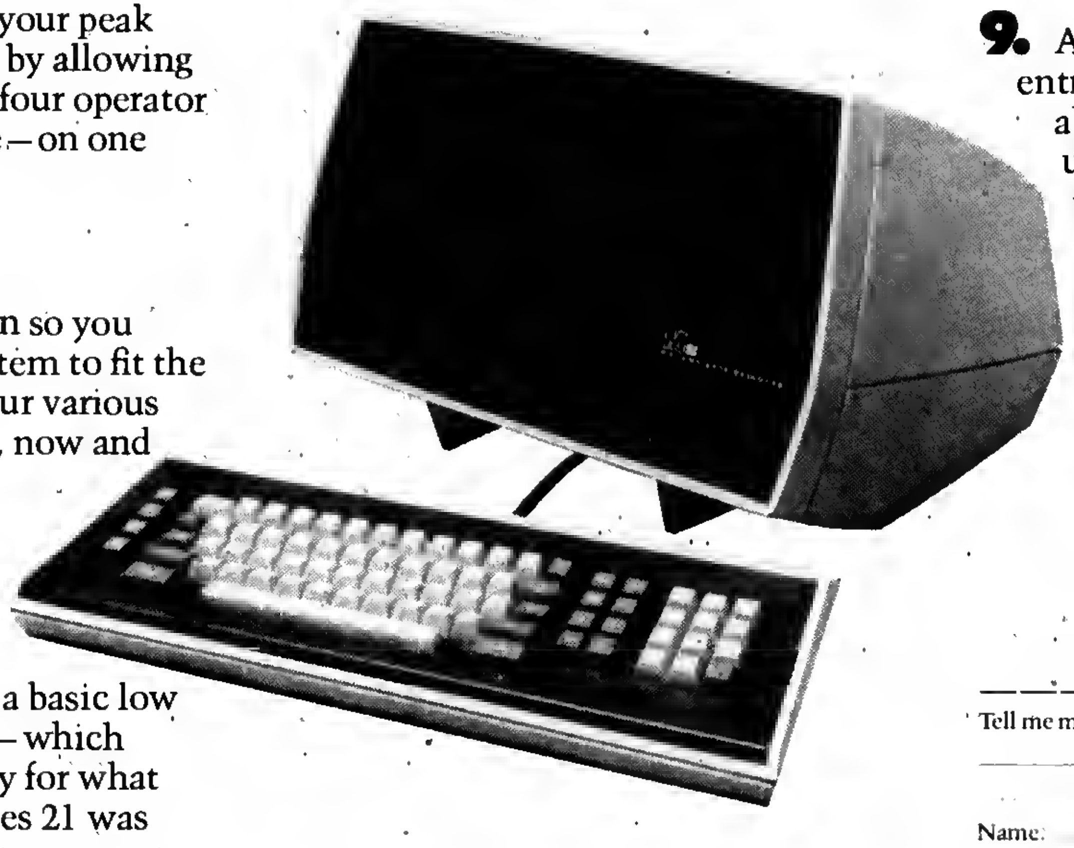

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MDS Mohawk Data Sciences

Scandinavians Seek Solutions to Dependency

By G. Russell Pipe

Special to CW

COPENHAGEN, Denmark — An association of top-level government and business DP executives here is encouraging public debate and public policy to reduce the impact of computers on employment, privacy, transnational data flow and other legal issues.

At a recent conference of the Nordic Data Union (NDU), Danish Minister of Justice Orla Moller opened a session by saying "The main reason for discussing the risk of computer dependency is the great efficiency of the machines which have major political consequences. It is claimed we are slaves of the technique because of its immense impact."

Some participants responded by stressing that the machine is not so much at fault as the resulting imbalances of power and loss of the ability to bring about social change attributed to DP.

But Moller discounted the threat of computers by noting that "they give politicians a tool for improved decision making." He cautioned, however, that "the more complicated the society, the more restrained the advice from specialists should be and the greater the role of decision makers."

The conference's theme was the increased dependency and vulnerability attributed to computerization in Denmark, Finland, Norway and Sweden. "National vulnerability is something countries must be vitally concerned about," according to Allan Eriksson, director of the Swedish Ministry of Defense's research committee on the subject.

Eriksson outlined three dangers:

- Concentration of computers in a few cities and a handful of major facilities.
- Technological dependence on DP for all forms of administration.
- Foreign data sources and services.

This heavy concentration of computer facilities and services is a product of centralization, particularly by national governments. It is a circular argument, according to one participant: "The concentration of computers requires a very big control system and vice-versa.

"If we could begin computerization today with all the knowledge we now have we could have stopped a number of techno-bureaucratic monsters," according to Jan Freese, director general of the Swedish Data Inspection Board.

"A techno-administrative alliance is believed to be a real threat to many Europeans, according to Paul Sveistrup, a Danish DP consultant and lecturer.

Computing has a bias toward the status quo because of the huge investments involved, it was noted. It was claimed this results in social paralysis, rather than causing needed reforms of government programs and in structures of commercial organizations.

Two Solutions

Two separate but complementary solutions were advanced to alleviate these problems: public discussions and debate on further "automation" of society; and creation of broadly representative data councils to conduct research and make advisory recommendations to governments and private industry.

"A main reason we are in this perplexing situation," Sveistrup believes, "is that the politicians, technicians, administrators and general public are not talking to each other on plans and goals for our societies."

By injecting public discussion and stimulating parliamentary concern, the "unholy alliance" between the technician and bureaucrat may be retarded, if not broken.

The concept of national data advisory councils, even with formal Nordic-level interaction, is not new. In Denmark an Economic Council studies trends and problems and submits suggestions to both government and business.

While no formal decisions were made, the chairman of the last panel, Prof. Knut Selmer of the Oslo University Law School, stated, "We have a much clearer picture of the problems and can go home to fit them into a plan of action."

Dossiers Under Probe

Special to CW

COPENHAGEN, Denmark — The Danish Government in 1969 forbade authorities from maintaining lists of persons because of their political beliefs or activities. It was recently discovered, however, that the editor of a Danish magazine, a right-wing conservative, has been keeping political dossiers on 60,000 persons and supplying their contents to the military security forces.

This practice was known to have been going on at least through 1973 and possibly longer and may involve improper government financial support.

Opposition parties in Parliament have called for a complete investigation of the affair. The Ministry of Justice, responsible for privacy legislation before the parliament, has downplayed any connection between the files and privacy.

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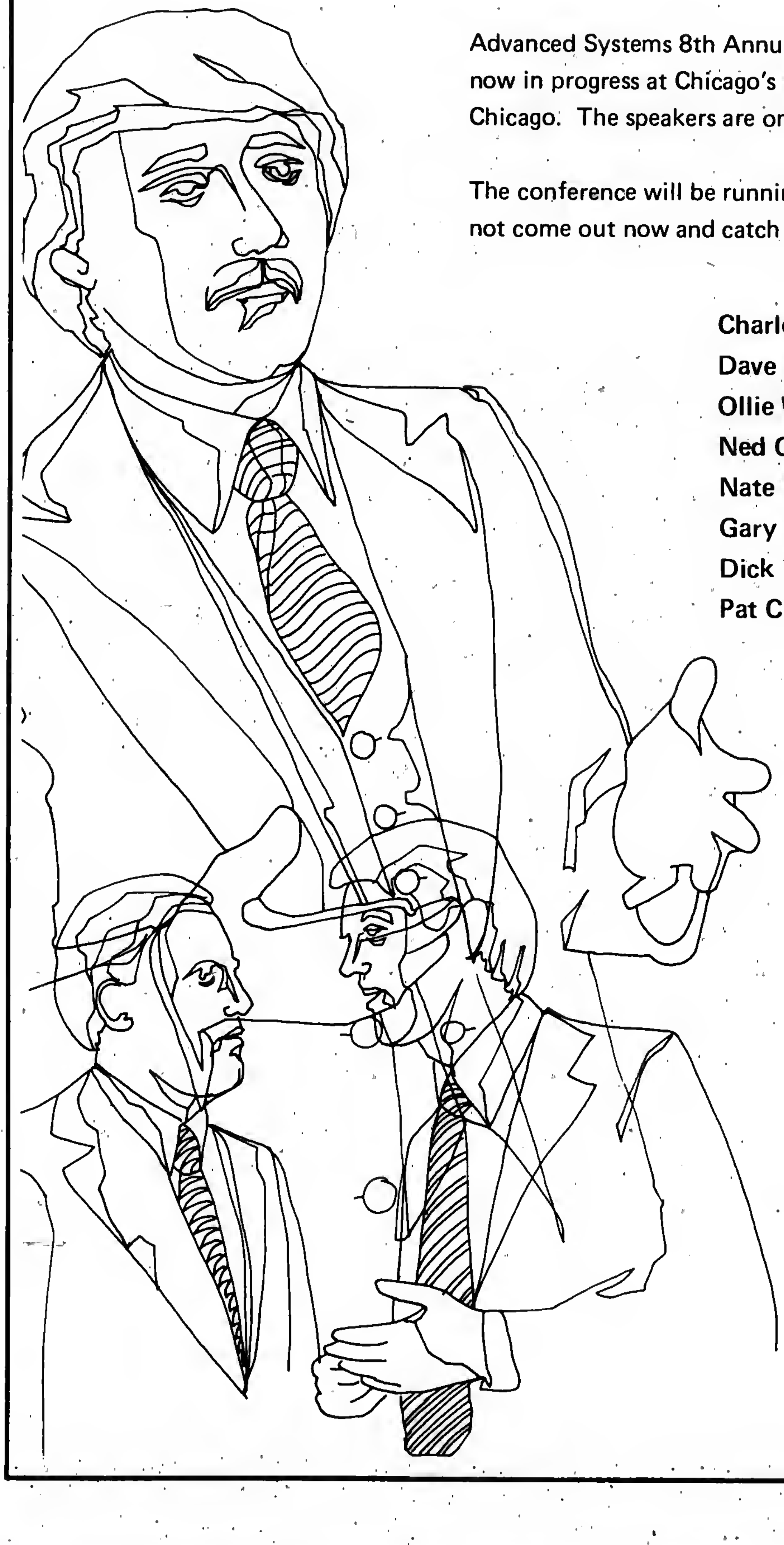

Advanced Systems 8th Annual Professional Training Conference is now in progress at Chicago's Marriott O'Hare, 8535 West Higgins, Chicago. The speakers are ones that you won't want to miss.

The conference will be running through Tuesday Sept. 27, so why not come out now and catch the remaining speakers.

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Scheduling System Helps Double Court Docket

By Jeffry Beeler
CW Staff

PONTIAC, Mich. — Circuit court judges in Oakland County have nearly doubled the number of civil and criminal cases they try each year as a result of an on-line justice system that both schedules court cases and keeps track of all public records filed in the office of County Clerk Lynn Allen.

Since installing the computerized system, each of the suburban Detroit county's 11 circuit court judges has heard about 2,000 cases per year, compared with an annual average of only about 1,000 cases for their counterparts elsewhere in Michigan.

This jump in courtroom efficiency contrasts sharply with the trend in most of the nation's other courts, where judges have complained about caseloads that in some instances have nearly brought the criminal justice system to a standstill. They see speedier court trials as one way to combat the nation's soaring crime rate.

Built around 1M-byte IBM 370/148, the automated justice system uses a data base in the county clerk's office to schedule court appearances so they will not conflict with lawyer's agendas. In this way, full docket for each circuit judge is assured each day.

"Case backlogs occur when there is not a full docket of cases each day," Fred Mester, court administrator explained. "The best way to keep the docket full is to get trial notices to attorneys before they make other commitments."

To date, the justice system computer, which operates in the county's computer services Division, has inventoried legal papers for about 300,000 circuit court cases, with 5,000 to 7,000 entries added daily.

Besides speeding the flow of courtroom litigation here, the system has minimized personnel expenses in both the court administrator's and the county clerk's offices, Mester said. Since the county installed the system in 1975, neither office has had to increase the size of its clerical and administrative staff.

Anyone interested in an Oakland County court case can use a terminal in the clerk's office to check on it. Here, Deputy County Clerk Richard A. Elliott (behind counter) helps E. Leonard Howarth, a local attorney, retrieve information on a pending case.

The computer also allows the county to notify attorneys up to eight weeks in advance of their scheduled court appearances. Lawyers here previously had only two and a half to three weeks' notice, Mester recalled.

These longer leadtimes have proved an important asset for Oakland County, which competes for each attorney's courtroom services on a first-come-first-served basis with four other nearby counties, he explained.

From Days to Hours

Before the county installed the current system, officials maintained their trial records on cards that had to be retrieved manually when clerks needed important information, like the number of court actions of a given type still pending. With that recordkeeping system, Mester's clerical staff spent the equivalent of three days to a week each year just processing the county's trial notices. Today, the staff does the same job in about three hours.

Last year, the county administrator's office generated about 30,000 trial notices, (excluding adjournment and other types of notices); during recent years, the volume of paperwork has grown steadily as the number of criminal cases climbed from just over 9,000 in 1965 to slightly under 20,000 in 1975.

With the earlier system, the county administrator's office was also unable to perform a number of other important recordkeeping functions like keeping track of the number of cases of each type (mediation, malpractice, etc.) heard by each of the 11 circuit judges.

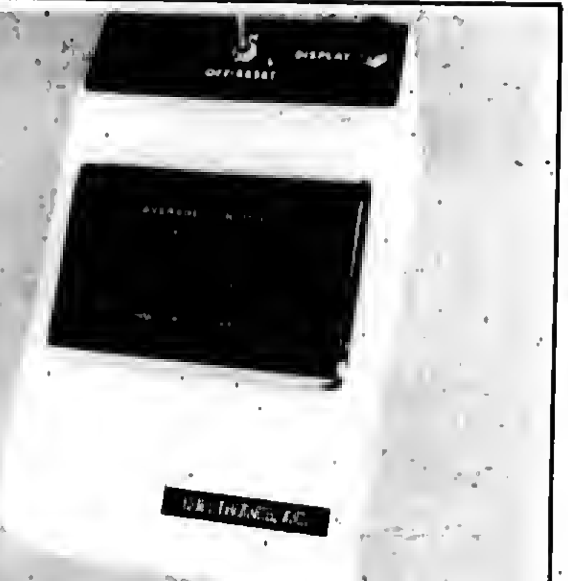
To eliminate these and other shortcomings, Mester and his staff replaced their manual recordkeeping method with the current system, which consists entirely of IBM hardware, including a Model 3286-2 printer, a 3704 communications controller, Model 3330-11 disk drive units and a Model 3277-2 CRT terminals.

Except for the CRT terminals, the system was configured from hardware already installed in the county's Computer Services Division.

The county administrator's office plans eventually to expand this configuration to include a CRT terminal in each courtroom, Mester said. When this proposed expansion takes place, circuit judges will be able to retrieve their caseload schedules from computer memory so they can plan their court appearances in advance and find out which of the county's courtrooms will be available at any given time or date.

Mester also plans to upgrade the system soon to track delinquent child support cases and to supplement the listings catalog in the county administrator's law library with pertinent titles from the Computer Service Division's five institutional libraries.

Terminal response time diagnosis.



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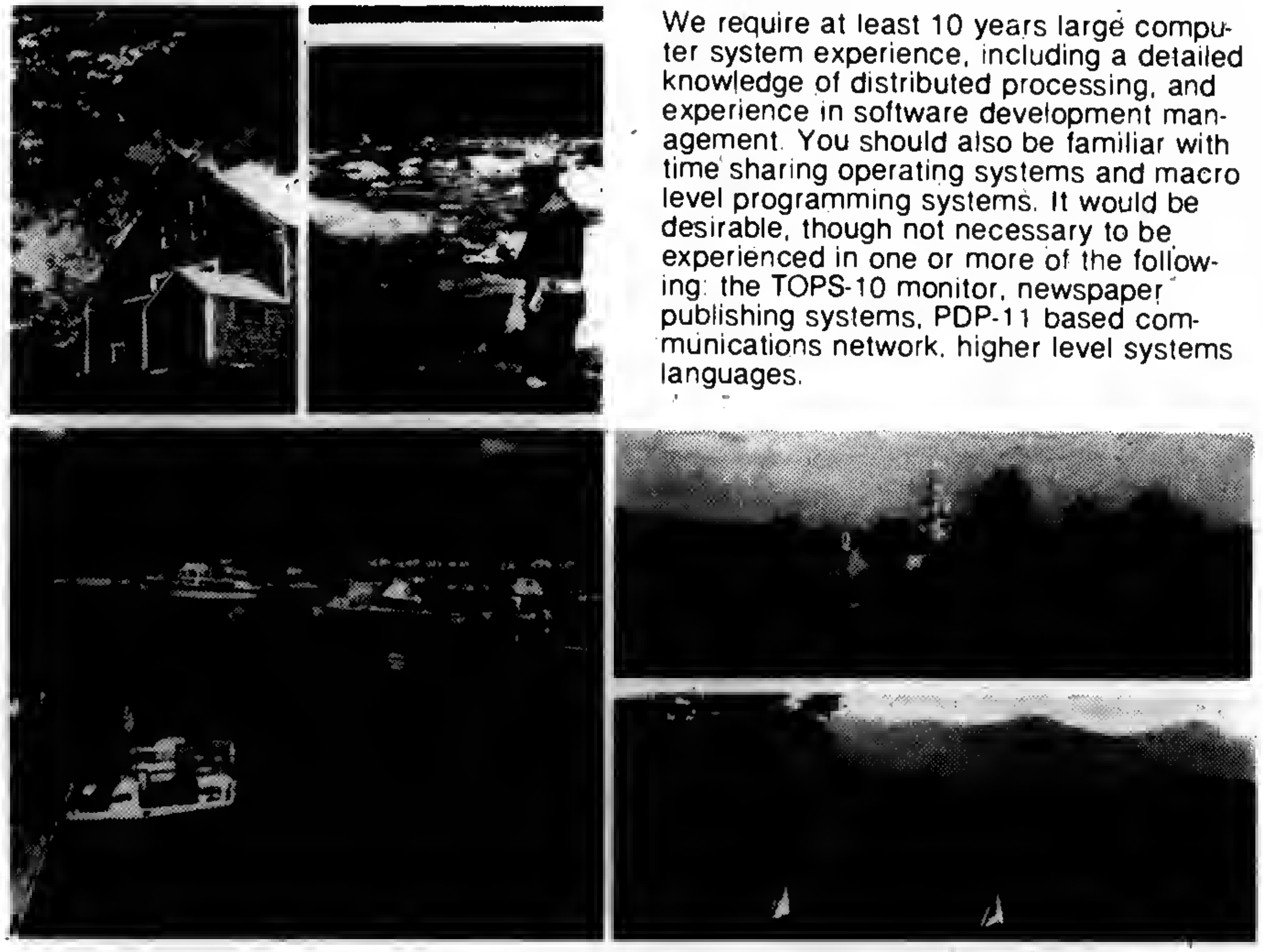

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System Analyzes Students' Journalistic Skills

By Denise Petski
CW Staff

MADISON, Wis. — Students at the University of Wisconsin-Madison School of Journalism here not only have to withstand the criticisms of their editors and professors but must also be subject to the analysis of a computer.

Prof. Kenneth D. Nordin used the computer in a news writing course at UW-Madison for the first time last fall, and it is still in the experimental stage.

The "Newswriting Analysis Program," which was developed at the University of Michigan by Prof. Robert L. Bishop, contains information on about two dozen "newsworthy" events and supplies a set of raw facts from which students can work. After a student writes a story, it is fed to the computer, which then sends back a list of critical comments.

Run on the university's Univac 1110, the program can spot repetitive sentence structure, overuse of adverbs and passive verbs, certain "planted" errors, inadequate use of quotes, libelous statements, good first paragraphs, overblown words and missed details. The computer provides appropriate feedback such as "good" or "Did you forget . . . "

Student reaction has been "at least cooperative and generally positive," Nordin said. The students seem to be intrigued that a computer can analyze their work. At present, 16 students can take part in the program at the same time, but the ultimate goal is to involve a much larger number.

While Bishop designed the program as a self-taught primer in basic news writing, Nordin sees the need for an instructor to look for things the computer doesn't see: the flow of words, transition of ideas and unity of thought within paragraphs. "Those kinds of things the program just can't pick up," Nordin explained.

Nordin believes, however, that there are objective and teachable standards for journalistic writing, and the computer helps make the point. "It's a very efficient way to make students aware of some of the basic elements of news writing."

Egg Farm's System Keeps Profits and Standards High

FOREST CITY, Fla. — In this small agricultural community just north of Orlando, the classic chicken or egg dilemma has received a new twist. It all started with the introduction of computer technology to the egg production industry.

Musselwhite Farms is one of the area's largest egg producers. According to the firm's controller, Don Bridge, the company has as many as one million chickens housed at 26 local contract farms in the area.

Each week Musselwhite receives and grades 300,000 dozen eggs. Data gathered from this "grade out" process is entered into an NCR 8200 computer through CRT terminals for processing via the egg settlement system. The system records egg production and runs comparisons using weekly standards, by strain of chicken, for jumbo, extra-large, large, medium, small and peewee eggs within Grade A.

Grade B, crax or odd-shaped eggs, stains, losses, pick-outs and "bloods" make up additional grading categories. The system also compares weight and mortality standards with actual results.

Once the data is entered into the computerized egg settlement system, the computer analyzes the information. Using the output, Musselwhite is able to compensate the farms and provides the farmers with vital production statistics.

Production information is critical to the profitable management of the farms — each of which specializes in a particular breed. Production data from the computer is compared to standards provided by the breeder, and problems which cause production drops are spotted immediately.

The egg settlement system was designed by American Software and Computer Services, Inc., a Tampa-based computer service firm. According to Larry Hires, systems engineer on the project, plans are now being developed for visual graphs of the production statistics. One graph per farm per week will be produced so that a picture of actual production versus the strain's standard will make for instant reference without the use of tables of numbers.

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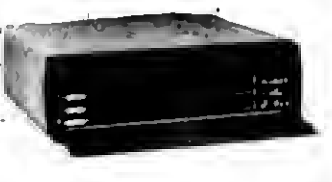

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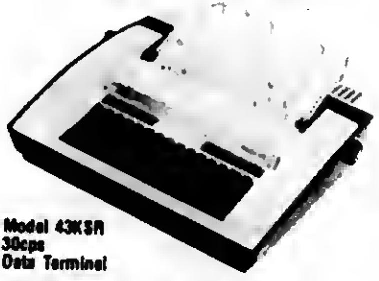

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Chase Vice-President Explains

Giros Help Consumers Keep Payment Control

By Toni Wiseman
CW Staff

NEW YORK — The concept of Giro payment services is widespread in Europe, but it is little understood and less implemented in the U.S.

There are various ways in which Giro payment alternatives interface with the electronic payment infrastructure — standing orders. Telephone instructions, authorized bills and automated teller machines (ATM); each offers certain benefits, according to George C. White Jr., vice-president of The Chase Manhattan Bank N.A. headquartered here.

For the consumers, perhaps the main advantage of using Giros is that he can control the timing and amount of his payments: with preauthorized payments, he loses such control.

"A Giro system is basically a payment system which allows a consumer to pay bills by instructing his own bank to transfer funds to the account of his creditor, in whatever bank it exists," White explained.

"As opposed to the debit flow of funds associated with normal bill paying with checks or preauthorized payments through automated clearing houses, Giro systems involve a credit flow of funds. As a result, one clear advantage of Giro payments is that returns for reason of insufficient funds are eliminated," he said.

Payments Simplified

The present check-processing system entails the clerical effort of check writing, difficulty in using funds as effectively as possible because of the variations in mail delivery and the cost involved in mailing and processing the check — a possible total of up to 28 cents per check.

A Giro system would simplify payments by combining bills or initiation of payments, ensuring complete control of date of payment for efficient use of funds and by providing a record of the organizations paid, eliminating reconciliation of paid checks, White said.

Giros would benefit corporations by making funds available on the day designated by the consumer; they would be relieved of the chore of depositing individual checks, he said. It would also simplify accounts receivable updating because payment data is submitted in machine-processable form, such as magnetic tape, White pointed out.

Four Methods

White outlined the four ways in which consumers can use Giros:

- Standing orders. A consumer can have his bank automatically generate constant-amount, periodic payments, for such things as rent, installment loans or utility budget payments. The bank is told the necessary information at the inception of the arrangement, stores it and includes it with the generated credit payments.
- Telephone instructions. A bank can be given instructions by phone to pay specific bills. This can be done either by conversation with bank employees or by direct connection to a computer via Touch-Tone telephones.
- Authorized bills. A customer can sign and physically deliver (via mail or in person) bills to be paid. This can be economically attractive if companies use some standard data line for the optical scanning capture of the data on the billhead.
- Automated teller machines. Consumers can instruct their banks to pay specific bills by use of an ATM transaction, using a debit or other plastic card. Banks would prestore company information because it would not be practical to have it entered each time at the ATM by the consumer.

Workshops on Privacy Scheduled for Phoenix

PHOENIX — A series of three-day workshops here this fall on security and privacy will discuss the recently published reports from the Federal Privacy Protection Study Commission.

The workshops, sponsored by Honeywell Information Systems, Inc., will be held Sept. 27-29, Oct. 12-14, Nov. 15-17 and Dec. 6-8.

A special discussion in each workshop will cover the impact of some of the commission's conclusions.

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Editorial

Alternatives Growing

The ongoing series of articles in *Computerworld* on the results of a survey of large IBM users proves one point conclusively: The alternatives facing computer users are growing every day.

In the past, an organization usually stuck with equipment from the manufacturer of the first system it installed, upgrading within that manufacturer's line. It was rare for a user to switch from IBM to any of the other manufacturers or vice versa.

The investment in programming, training and support was just too great an obstacle. The cost of conversion from one system to another severely limited a user's options.

But all that has changed, thanks to two developments: alternative mainframes and distributed processing.

Most large users in the survey — which was admittedly a limited sample, with 20 users contacted — have at least considered alternative mainframes for their present IBM installations and a majority were at least considering distributed processing alternatives [CW, Sept. 19].

But while all that is encouraging, there was also some not-so-good news.

For example, almost 30% of the people who had considered the alternative mainframes did not take the extra step of actually evaluating those offerings. Furthermore, there was a great deal of confusion over what was meant by distributed processing.

It is discouraging that a relatively high percentage did not actually evaluate alternative equipment, because it should be the responsibility of all DP shops to look carefully at any method of possibly reducing costs.

In most organizations, DP is an overhead item and DP operations are often criticized for their high costs. Without careful evaluations of ways to save money, DPers leave themselves open to the charge that they do not care about the profitability of the coporation they serve.

This is not to say that alternative mainframes will be right or cost-effective for everyone — clearly they will not be. However, without a real evaluation of those alternatives DPers will not know whether they will fit into their particular organization.

The confusion over distributed processing is also disturbing. If DPers are confused about the meaning of the terms they use, then upper management must be even more confused as it hears the terms bandied about. DPers have a responsibility to communicate with top management and they probably should do it in a jargonless form if they want to be understood.

Users — particular IBM users — are going to have even more alternatives from which to choose in the future and this is going to place a great deal of responsibility on the DP manager.

No longer will DPers be able to comfortably stick with one supplier, slowly wending their way up the upgrade path. They will have to perform more in-depth evaluations of the alternatives available.

This may make DP manager's job more difficult, but the opportunities for true cost savings will make the effort worthwhile.

Data Past

Five Years Ago
Sept. 27, 1972

WALTHAM, Mass. — Honeywell Information Systems introduced two computers in its Series 2000 family and announced major enhancements including communication facilities for its small Model 58 computer system. The 2040A and 2050A systems could be upgraded at the customer's site by adding power modules and memory units.

— — —

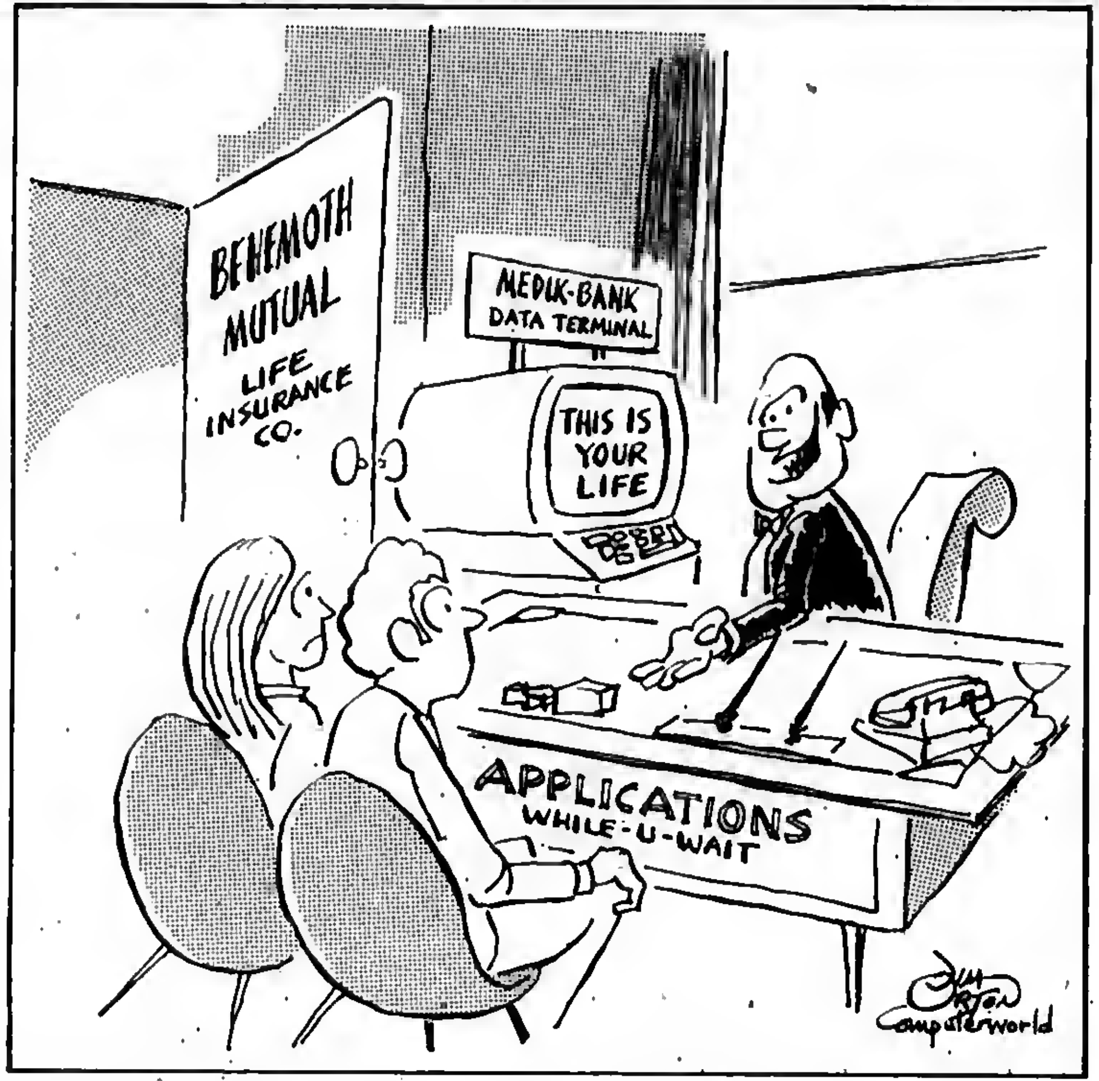
EL SEGUNDO, Calif. — Xerox announced two enhancements for users of its XDS virtual memory system. Real core memory support was increased from 512K to 2M bytes for the Sigma 9. A disk-only system was provided to replace the rapid-access device system for residency and swapping previously required by the Sigma 6 and Sigma 9.

Eight Years Ago
Oct. 1, 1969

WASHINGTON, D.C. — A national microwave comunications network in direct competition with the Bell System was planned by Microwave Communications, Inc. When conceived, the network would mark the first time common carrier facilities were available from nontelephone sources on a nationwide basis.

— — —

GRAND RAPIDS, Mich. — The IBM System/3 faced its first rival with a small system introduced by Cascade Data Systems. The 88/30 offered reader speeds similar to the faster reader on the IBM system and added four cartridge tapes. The system sold for "under $30,000" or rented for about $875/mo compared with the approximate figure of $1,000/mo IBM charged for its System/3 with comparable reader speed.



'Well, Put It This Way, Folks — If There Is Anything Sacred Anymore, We're Not Aware of It . . .'

Letters to the Editor

RCA Offered 360 Mode

Allow me to calm the astounded Seymour J. Metz ["Spectra Not IBM Compatible," CW, Sept. 12].

Metz is correct in stating that RCA's Spectra and 2,3,6 and 7 compared to IBM 360s have significant architectural differences. However, he does not seem aware that in 1970 RCA offered to the commercial market a fully supported software package called "380 Mode of Operation."

This site-tailored program resided in the Spectra system's high memory and simulated IBM 360 IPL and privileged instruction execution. 360 Mode translated 360 channel programs to Spectra, executed those channel programs and translated interrupts to 360.

Model 360 disk packs, tape volumes and unit-record files resided on RCA equivalent devices, without change. 360 Mode supported IBM 360 DOS, OS and standalone utilities and, believe it or not, is still in production at several installations.

After RCA's demise, Univac continued to sell and support RCA's 360 Mode, now offering similar 360 and 370 modes of operation on Univac 90/60, 90/70 and 90/80 systems.

Amdahl might take note that, in part, because of IBM's ability to quickly cause any given alternative system to become obsolete, RCA's and Univac's intentions seem to be to provide a smooth means of conversion to the vendor's "native mode."

Jerry B. Nesmith
Atlanta, Ga.

Standards of Good Practice

As vice-president of the Society of Certified Data Processors (SCDP), I couldn't agree more with Alan Taylor's column of Sept. 5.

The SCDP, as a charter member of the Institute for Certification of Computer Professionals (ICCP), looks to the institute to define standards of good practice and good conduct. The institute has designated Oliver Smoot as chairman of this standards committee.

Naturally, he can't complete his task for the ICCP alone. Even though it requires the ICCP's neutrality, he will need to rely on coordination with the American National Standards Institute (Ansi), the American Federation of Information Processing Societies (Afips) and constituent groups.

We're all in this together and working together is the best part.

J.J. Martin
Memphis, Tenn.

South African Figures Wrong

The Aug. 22 issue contained an article on the South African computer market ["South African Users Tighten Belts"] in which you stated that IBM possesses approximately 50% of the market with ICL second, holding 25%.

This is totally inaccurate and the exact figures are broken down as follows:

Firm	Systems Installed/ On Order	Share Of Sales (%)
ICL	395	33
IBM	340	34
Burroughs	127	14
NCR	101	4
CDC	12	7
Univac	39	8

From the above, it can be seen that ICL is the leader in the number of systems with IBM very marginally ahead on sales value.

Susan E. Croft
Public Relations Executive
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Success Story Nominations Come Rolling In

By Jack Stone
Special to CW

There you go again! When the issue gets deeply personal, the exquisite communications capability that lies dormant in so many DPers comes roaring forth. In this case, I refer to the quality of nominations I have received in response to my search for the DP Success Story of the Year [CW, Aug. 22].

In this column, I want to provide a progress report on my quest, a change in ground rules and some guidelines for "success" as a remote computing service bureau — as originally developed by the Marquis de Sade.

First, good looking nominations have been received from: Pepperdine University, Malibu, Calif. Montgomery County Government (Md.); Garst & Thoman Hybrid Corn Co., Coon Rapids, Iowa; Catholic University (D.C.); Unisystems, Inc., Dallas; BancOhio Corp., Columbus, Ohio; and du Pont, Inc., Wilmington, Del.

Second, I received a bunch of indirect nominations from the Univac News Service and another one for the Mead Corp. Data Center in Dayton, Ohio. Sorry, nominators, but the rule is that the installation itself must come forth with the letter of justification.

Third, having been soundly chided by several readers for limiting the search to only 93% of the population by excluding scientific-oriented installations, I have lifted all restrictions on applications orientation. However, I will install a uniform questionnaire to be answered by all nominees requesting, among other things, that they define the success criteria they used and the measurements employed.

Remember, to nominate your installation (IBM 370/145-class machine or larger) as the DP Success Story, send a letter of justification to me, keeping its length to under 500 words. Include an OK to use your and your firm's names plus an invitation to me from a person in authority so I can interview members of the staff for subsequent writings (travel at my own expense). Each nomination will be acknowledged with a complete set of my CW articles. Also, I'll drag in some big guns to discuss the nominations before the final selection.

Of course, lurking in the background during this frenzied search is the as yet unanswered question : Will Stone's Theorem on DP success — that humanistic goals must be met before technical/business goals will be achieved — be validated or rent asunder? Well, if Al Muehlberger's letter is any guide, I'm on the right track. Let me quote the two introductory paragraphs from his nomination letter for Montgomery County government, where he is the director of management information services:

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

"My orientation to my job is nontechnical. I advertised myself to my current bosses three years ago as being a people-oriented manager and not a bit-chaser. My personal interests lie in the more sociological-type things — the effects of which I try to bring to the job.

"I contend, as I think you are saying, that the successes we are looking for in the field are only going to come about when we seek them in human terms and take into consideration the total human atmosphere in which they are to be pursued and made useful. In that pursuit, we have to understand human behavior.

The Human Connection

"I don't think anyone is confident enough to come right out and say 'Look at us — because we're a success.' There is too much insecurity in all of us to take such a risk. We all have successes and failures. Human nature being what it is, we are all afraid to brag too loud because we each live in some kind of glass house and could be made fools of too easily. When there is some confidence and some success, we should feel safe to proclaim it accordingly — but be ready enough to deal confidently with the failures. We think our department is like that . . . "

Now for the piece de resistance! Consistent with the "success" theme, I just had to present you with some basic guidelines on how to operate a "successful" OS/TSO/370 service bureau, based upon a recent particularly agonizing experience of mine:

1. *Be sure to include in the user's manual intricate detail on key terminal commands that are not supported.* This strategy encourages the sophisticated terminal user to (a) go out of his everlovin' mind trying to untangle the garbaged output before he gives up in total disgust, then (b) call the so-called "user support" group for assistance so that he may receive the comic book response, "You know, we really ought to clean up that manual."

2. *As a full service corollary to Guideline 1, make certain that other key commands that are not supported are specified in the HELP data set.* This tactic is insidious, to say the least, because the user will figure that HELP is right where the manual is wrong. A particularly diabolical twist is to include in HELP an *unsupported* foreground Cobol compile command.

3. *Emphasize in your marketing programs a very wonderful time-sharing capability and then permit only background compiles.* You can add some high-powered fuel to the hot temper of the users by providing a whiz-bang 25-minute background Cobol compile.

4. *Keep user account codes in the underground vault, absolutely inaccessible by the user support group.* This policy will guarantee that the user shall not operate during off hours should the poor slob forget the code.

I'm sure that if you follow these simple rules, adapting them to your particular environment, you will be successful, at least according to one installation's warped sense of performance.

Voyager II System Has Proven Its Value

The Taylor Report

By
Alan Taylor
CDP

"The computers have done everything we asked them to do, and Voyager II is going fine," was how Tom Draper of Caltech-managed JPL put it. He was echoed by National Aeronautics and Space Administration (Nasa) program manager Rodney Mills: "There has been a lot too much negative publicity about the computers and Voyager. They and the spacecraft are doing perfectly, and we have proved their value in space much more thoroughly than we ever expected." What, then, was the cause of the widespread publicity about a "mutinous" computer?

First of all, despite the claims that the computer worked perfectly at all times, there was a distinct computer problem that was really hardware-related. The memory was simply too small, so JPL used one register to store two functions. Owing to a previously known problem in the JPL designed Honeywell-produced Canopus star tracker, the functions interfered with each other, causing chaos.

This, however, did not occur until some time after the Voyager computers were first thought to be on the blink. The idea that the computers were doing something wrong arose almost immediately after the release of the spacecraft from the Titan rocket, when the Attitude computer suddenly switched from the primary control system to a standby one.

The switch was interpreted as suggesting that the Control computer had found something wrong in the Attitude computer. In fact, the Attitude computer was fine and remained so except for an initialization bug in the switch program.

Programming Bug

This particular programming bug occurred when the initialization routine for the standby computer simply duplicated the initialization routine of the primary Attitude computer — and forgot to pick up the latter's readings as to the current attitude of the spacecraft. Naturally, this caused some chaos later when they had to go through an unexpected series of 360-degree and 42-degree search maneuvers to find the sun. But the program to correct this error was right on the spacecraft, and it worked.

And there was a later programming bug involved in the resetting of a parameter at the end of a search cycle when the star Canopus is lost. The Canopus star tracker is really not a star tracker at all, it is JPL-designed bright spot tracker, which has earned its grandiose name from usable, although not perfect, performance on earlier space flights.

Bumps in the Night

The trouble is that the tracker cannot tell the difference between a dust particle passing over the sensor and the star Canopus (or any other star for that matter). It selects and tries to follow the brightest image around. That, fairly commonly, is a particle from the spacecraft itself.

When a group of particles passed over the sensor during the search sequence (i.e., after lock-on has been lost for some reason — probably another space-craft particle), the routine was set to increment the parameter by 0.04 each time a new particle was found. But at the end of the cycle, they reset by decrementing only once — which naturally did not work unless there was only one "bump" around. In fact, there were many. Now, this too has been fixed.

However, while a too-small computer memory and two fixable program bugs did occur, their importance was dwarfed by the noncomputer errors that were involved in the launch. If it had not been for the recovery power of the computers, the noncomputer errors could easily have ruined part of the mission if not all of it.

I don't think I have found all of the errors yet, but here are a few:

- Overloaded Gyros — The gyros were knowingly overloaded in the boost phase and naturally did not keep in perfect synchronization with each other. They even hit other parts of the craft during boost maneuvers. Again, this was done knowingly and caused no harm.

What did cause problems, however, was when the computer was not told of any overloads and was instructed to report whenever sets of readings from different gyros did not fall within reasonability limits set for cruise, not boost, conditions.

- Slow Valve Check — The thrust motors were turned off after the spacecraft was on its own so that a number of valves could be checked to see that they were not stuck and were in the right position. A check takes only a few milliseconds, but

(Continued on Page 20)

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Systems on Voyager Should Get Credit

(Continued from Page 19)

only one valve was checked per second and for up to a minute all thrust motors were inhibited.

No one told the computers that the thrust motors were being inhibited or that normal reasonability checks were not in force. They therefore switched from one set of valves to another and from one set of electronics to another to try to keep the spacecraft on course.

The system suspected itself, and that is what caused the computer switch to the standby systems and started the rumors of the computer failue.

- Unchecked Frequency — The communications frequency of the spacecraft was sent to the tracking stations after Kennedy Space Center released control to JPL without being checked after a manual transcription had occurred. As a result, communications in real time were lost for about 20 minutes — just after the switching of the Attitude computer.
- Wrong Firing Calculations — The rate of jet firings during pitch maneuvers was incorrectly calculated as being well below 750 firings every five minutes. In fact, it was consistently above this and every time it went above, flags were set that prevented any sensitive-flagged sequence from taking place.

One such was the second attempt to lock the science-boom in place. This was properly aborted, giving rise to the "mutiny in space" idea.

The upshot of the matter is that the public is under the wrong impression. The insiders who know what was involved in the multiple-particle problem and the "mutiny in space" ideas are resentful of the press reports, thinking that writers jumped to conclusions, as one JPL spokesman told me they had.

In fact, the computers, while perhaps too small, may well have saved the Voyager II's mission. This is something that deserves public acknowledgement.

How about it, Caltech? JPL? Nasa?

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CCP a 'Cliquish Vanity' Emphasizing Education In Place of Real Ability

Reader Commentary

By Jeff D. Murphy
Special to CW

It is time to speak out. The world of the programmer is crumbling before our eyes, but we do not see it.

I refer to the destruction which awaits us at the hands of one-half of one percent of our own members. Specifically, I refer to the Certificate in Data Processing (CDP) and the Certificate in Computer Programming (CCP).

Computerworld tells us there are approximately 10,000 holders of either a CDP or CCP. The U.S. Department of Labor estimates the total number of programmers at 200,000 and growing.

Nearly every issue of *Computerworld* has someone pushing for the acceptance of the CCP as the standard, the proper measure of a programmer's worth. On the face of it, this sounds like a great idea — an educational value worthy of pursuit.

So worthy, in fact, that I wrote to the Institute for Certification of Computer Professionals for a copy of its most recent announcement and study guide.

But there are things not mentioned by the supporters of the CCP.

The first problem with the CCP test is the $75 testing fee. Why on earth is the cost so high? I am not receiving anything for my money but the opportunity to take a test — and, perhaps, if I pass, a certificate which presumably would be my passport to better jobs.

Second is the areas covered by the test. Most programmers are business programmers. I challenge the Data Processing Management Association to produce an advocate that can demonstrate that knowing Boolean alegebra or tree and plexus data structures will make an individual a better business programmer.

Crucial Knowledge?

And how many DP managers consider it important that their programmers are conversant with, as the study guide suggests:

D. Professional Ethics and Legal Considerations
  1. Privacy.
  2. Security.
  3. Patents, copyrights, trade secrets.
  4. Personnel practices.
  5. Contracts (e.g. commercial, employment).
  6. Human impact of computers.

The point is that there are areas in the test which have nothing to do with testing the effectiveness of an individual's programming ability.

Third is the choice of terms used by the study guide writers. I think I understand subroutines. But to pass the test I am to be familiar with;

B. Program Structures
  •
  •
  •
  4. Subprograms
    a. Calling routines
    b. Common area
    c. Reentrant
    d. Local/global variable
    e. Open and closed
    f. Parameter message.

Tell me: How many of you reading this have any idea what a "local/global variable" is? Or what "snapshots" refers to in debugging a program? The study guide has such terminology in abundance. (Perhaps that is because the industry has such terminology in abundance.)

The fourth problem deals with the approach to storage media, where the programmer should know:

1. Physical characteristics of primary and secondary storage (e.g. track, sector, read-write heads, volume, speed, access time, etc.).
2. Selection considerations.

Now, I know what tracks and sectors are. But on which machine? Am I expected to know their use on an IBM 370/158, an NCR 8250 or an Imsai 8080?

The peripherals are all different for these machines, and the access methods are different. If I am only to understand the terms, then why don't we classify them under a more cogent label, such as "Terms to Know"?

Safely Disturbed

All right, so I'm begining to reach a little. There is a great deal of information outlined in the study guide which *should* be required knowledge for programmers.

(Incidently, if you are beginning to wonder why I keep harping on the point that it is programmers who are being tested, rather than systems analysts or management, the name of the certificate is Certificate in Computer Programming. And it will be programmers who will be required to have it if it is ever adopted as an industry standard.)

And one can argue that we need to encourage educational facilities to systemize their instruction along these lines. I am referring to the information under "II. Principles and Techniques of Programming," which is very well thought in general.

To force the adoption of the CCP as a standard for data processors, however, is to disturb the safety of 95.5% of the DP world by substituting educational attainment for demonstrable ability.

So why don't we let the CCP remain what it is — a cliquish vanity that suggests elitism to the unitiated and makes money for its creators.

Murphy is marketing monoger for CMI Systems, Inc., o softwore firm in Renton, Wosh.

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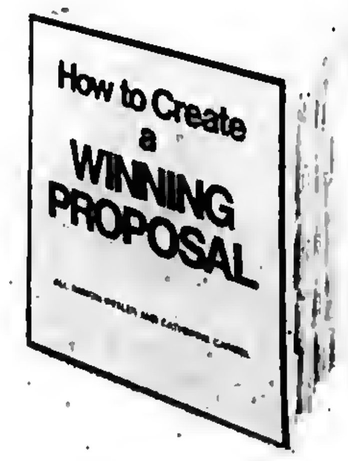

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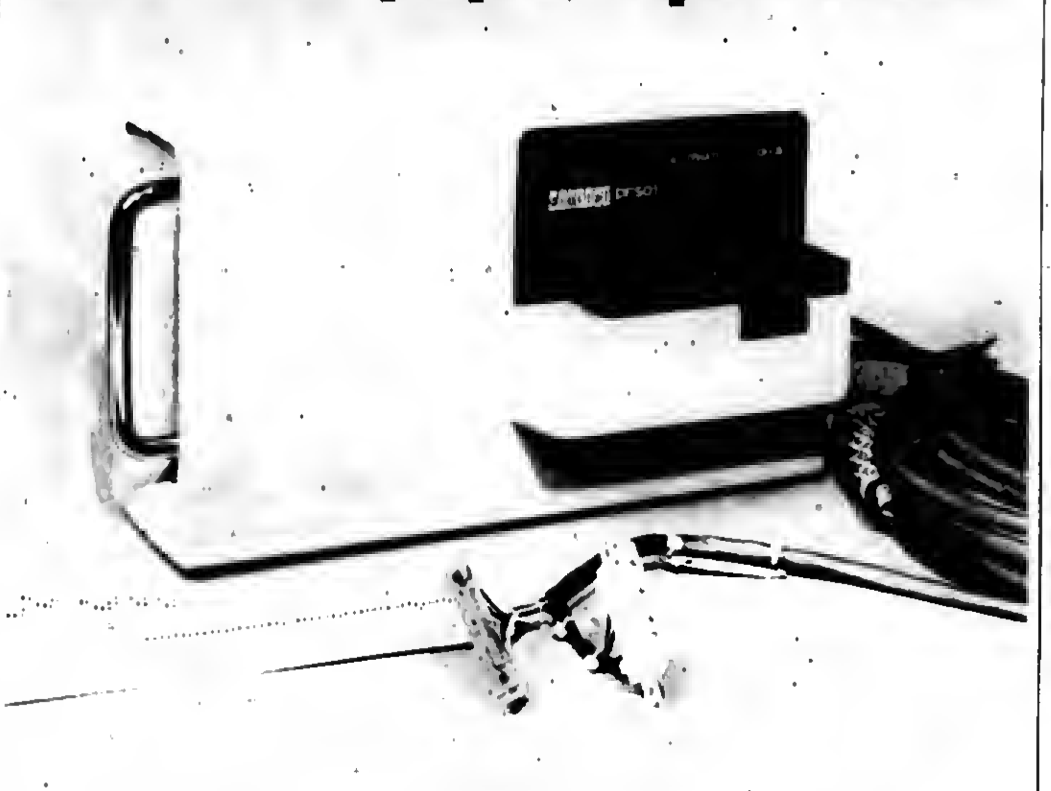

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Reader Commentary

In Turning Esoteric to Understandable

Technical Writers Really Communicators

By Glenna James
Special to CW

"Low priority." "Hateful work." "What documentation?" Those might be some answers to a query on documentation in a typical DP environment.

Maybe DP needs more writers and maybe writers need to know more of what DP documentation expects.

As a novice tech writer just wrote in a letter asking for my help, "It seems to be an extremely esoteric subject." Yes, Virginia, so it seems. We confront fragmented and varied recommendations (volumes and volumes of it) when we study writing about systems today.

Programmer/analysts don't like to write narrative materials, standard formats never seem to fit and the job is tossed off to a writer who is bewildered because there is no one firm rule which fits all technical documentation tasks. Rarely is it done throughout an organization according to a precision standard procedure. Why?

Enter the human element. The documentation writer must translate or interpret before writing, therefore acting first and foremost as a communicator and grasping messages from the designer, the end user, the DP manager, the programmer/analyst and the operations personnel, not to mention the software and hardware manufacturers.

The writer must then translate and mesh all of these messages into documents to serve various levels of management and various levels of users. The technical writer, then, is translating probably five or six "languages" when these levels of human communications are considered.

Since the end product must address specific audiences, the writer must consider both source and interpretation to produce a meaningful, useful document. And added to that?

Enter style. Style, in technical writing, does not correlate to style as we think of it in creative or journalistic writing.

The most important element within a style as it pertains to technical writing is *clarity*. Keep it simple, concrete and, if procedural, active.

There is no such thing as one technical writing style. If we must decide on one, let it be elliptical — marked by extreme economy of writing. Procedures will be understood if they are brief, do not require interpretation and are easy on the eye. (Manual readers like a lot of white space.)

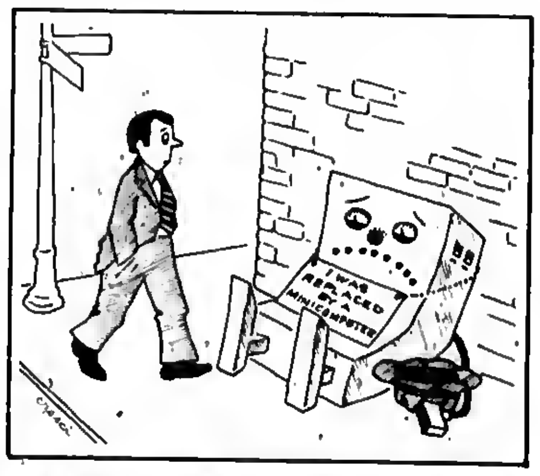
This is not to say that the documentation should be incomplete. Say it all, but in the least number of words and use simple words that are clearly understood.

Format? Use columns, blocks, matrices, bubble charts, flow charts, playscript, decision tables, narratives, graphics, outline and/or headline formats, Virginia, *if* they get your message across. Just as no one standard fits all documentation, one manual may use to advantage more than one format.

Last but not least, dear Virginia, learn to interpret all the mysterious terminology thrown around by this computer generation and translate it if your audience requires doing so. If you are writing for programmers, use their language.

But remember, the user is not a programmer. When in doubt, spell it out. Index the simplest of the acronyms in the back of the manual you write.

Technical writers still abound; they're just called communicators.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Study Planned On DBMS

NEW YORK — The American Institute of CPAs, along with the Canadian Institute of Chartered Accountants and the Institute of Internal Auditors, have launched a joint project to conduct research on the audit impact of data base management systems (DBMS).

The final report from the task force responsible for the project is not expected to dwell on explicit features of individual DBMS, although it may use some as examples of more general points.

The task force is planning to hire the services of a full-time researcher for one year. The position requires a person with a computer auditing background, a thorough knowledge of DBMS and an understanding of research methodology.

Persons interested in the position should send a description of their qualifications to Paul Levine, manager, Practice Applications, American Institute of CPAs, 1211 Ave. of the Americas, New York, N.Y. 10036.

Fortran IV One Highlight Of IBM 34 Enhancements

ATLANTA — Fortran IV, a Job Analysis System and on-line application systems for distributors and manufacturers were among the software offerings announced by IBM with its recent introduction of System/34 enhancements (see story on Page 49).

Fortran IV, scheduled for release next July, significantly extends the repertoire of languages available to the users of these small systems. Previously, the options were limited to RPG-II and Basic Assembler, a spokesman acknowledged.

Job Analysis System/34 (JAS/34), also set for release next summer, is "sort of a project management tool," he said, adding that it allows the user to plan for almost any type of project susceptible to Critical Path Method (CPM) analysis.

Fortran IV will carry a monthly license fee of $100, while JAS/34 will cost $68/mo.

Accounting System

The Distribution Financial Accounting System II (DFAS II) was introduced to assist its target users with on-line support for general ledger, accounts and payroll applications. The programs complement the previously announced Distribution Management Accounting System II (DMAS II) that handles billing, inventory control, accounts receivable and sales analysis.

The DFAS II modules should require no programming modification by the user, IBM said.

DFAS II modules are separately priced. Accounts payable and general ledger cost $35/mo each and the payroll module has been pegged at $47/mo.

The Manufacturing Accounting and Production Information Control System (Mapics) provides ready-to-use programs for 11 application areas incuding order entry and invoicing, inventory management and accounts receivable. Other areas are general ledger, accounts payable, payroll and product data management.

The final application areas supported by Mapics are material requirements planning and production control and costing. The software also provides data collection system support, IBM noted.

Each of the modules is separately priced with monthly license fees ranging from $35 to $90 each. All will be released in the period from November through February, according to present plans.

Interdata Updates OS/32 MT

OCEANPORT, N.J. — An enhanced version of the OS/32 MT operating system and a separately priced Multi-Terminal Monitor (MTM) software option that works with the update have been announced by Interdata for use with the company's 32-bit CPUs.

The Dynamic OS/32 MT supports multiprogramming with up to 255 user tasks written in Fortran, Cobol, Basic or Assembly language. It includes a real-time executive for resource management, task scheduling, roll-in/roll-out and subsystem management, a spokesman said.

File management with device-independent I/O and support for temporary files as well as spooling of both input and output are also built into the Dynamic OS release.

The resource management capability includes support for dynamic allocation of main memory instead of the partition approach used in earlier releases of the software.

The subtasking capability includes the creation of subtasks and segmentation of programs into "pure' and "impure" parts. The pure segments are those portions made up of reentrant code.

The spooling facility reads card images onto disk, on the input side, and writes printer images on disk, after which they are moved to the printer as it becomes available, on the output side of the operation.

Entire reports are spooled to disk before any printing is started, Interdata said. This delays the start of print runs, but means extra copies of reports can be made as needs arise.

The MTM option supports up to 16 concurrent on-line program development terminals and 16 background batch tasks. This means the OS/32 MT user now has remote job entry capability.

MTM includes an accounting mechanism which records system usage. An accounting program is available to provide reports of that use, the spokesman noted.

Dynamic OS/32 MT for either the 7/32 or 8/32 systems costs $5,000, which includes one-year paticipation in Interdata's Software Subscription Service. The MTM option, which requires the updated operating system, costs an additional $2,500.

Interdata is at 2 Crescent Circle, Oceanport, N.J. 07757.

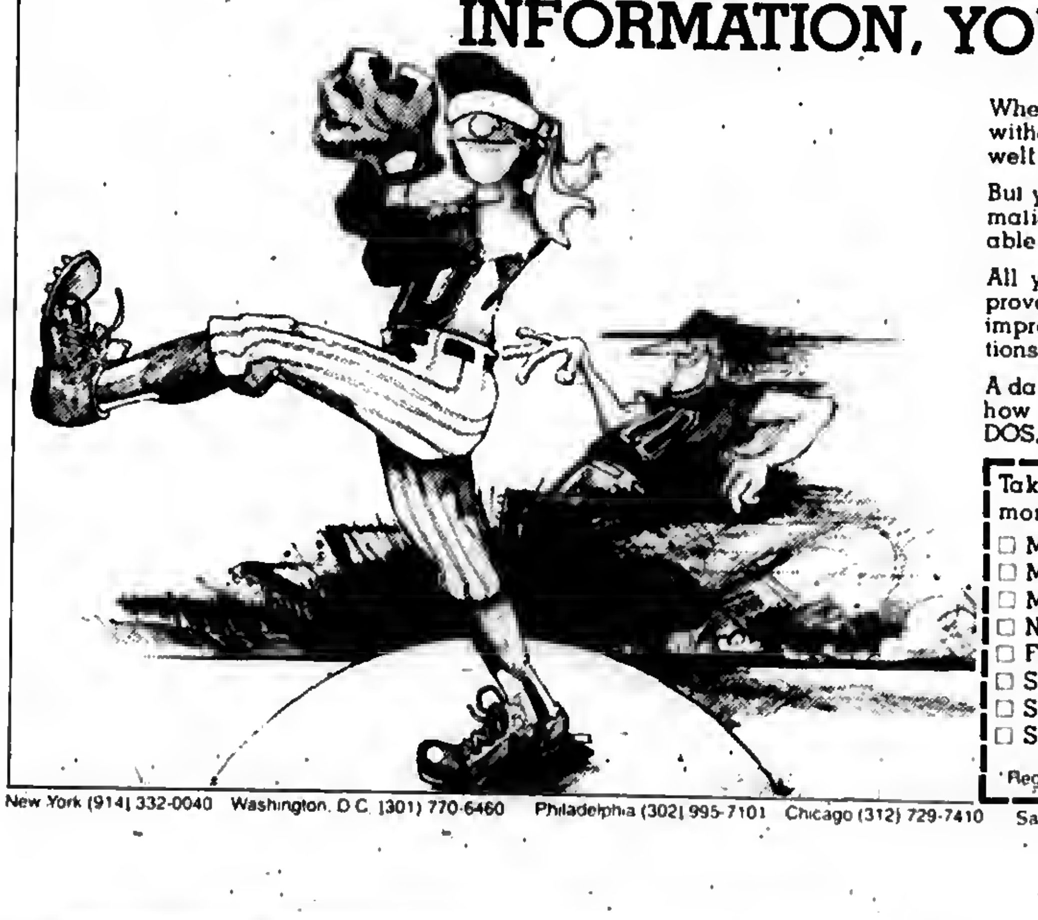
Basic Available For IBM Series/1

BIRMINGHAM, Ala. — Basic/1, an interpreter developed by Graham Computer Enterprises, Inc. (GCE) for the IBM Series/1 minicomputer, is said to offer the features defined in the American National Standards Institute (Ansi) proposed standard for minimal Basic, which was released for comment last December.

In addition, however, Basic/1 provides many extensions to that proposed standard, paticularly in the area of file processing, character string manipulation and output formatting, GCE said.

Files can be created, deleted or renamed within Basic/1 programs and can be accessed sequentially or randomly. The initial re-

(Continued on Page 25)



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Data Administrator Duties Differ From DBA's

By Stephen L. Robinson
Special to CW

Data Base Corner

In a recent Data Base Corner [CW, July 25], I started a discussion of the differences between the responsibilities of a data administrator and those of a data base administrator (DBA). In this column, I'll go into more detail on the concepts of data administration.

Without muddling the terminology maze further, the most descriptive title I have heard for the data administrator's position (employed at General Foods, Toronto, among other places) is "manager of data resources." One of my colleagues, Arvind Shah of Performance Development Corp. (PDC), suggests the term "data controller," since the data administrator is to corporate data what a controller is to corporate finances.

Whatever the title, the data administrator is responsible for establishing, monitoring and, when necessary, modifying an organization's policy for data gathering and utilization. This responsibility transcends functional boundaries (a fact that argues against the establishment of a data administrator in many organizations).

Yes, but what does the data administrator do?

In approximate chronological order, the data administrator:

- Takes inventory of existing data collection, storage, maintenance and utilization.
- Builds a model of the relationships between the data elements which exist.
- Analyzes data/information requirements of the organization as a whole.
- Builds a model of the relationships between data elements which would reflect actual requirements, not existing systems.
- Develops a plan to evolve from the existing systems to an implementation of the second model.
- Works with the data base administrator to make it happen.

In the rest of this column, and in subsequent columns, I shall expand on each of these tasks.

Taking Inventory

In two columns last spring [CW, May 23, 30], Bob Chamberlain, a colleague of mine at PDC and CACI, Inc., described information flow analysis (IFA), the inventory taking process. I direct the reader to his columns for an overview of the IFA process and rationale. Rather than duplicate Chamberlain's efforts, I will summarize some of the key points and then delve into some of the nitty gritty.

Briefly, an IFA (which should probably have been called a DFA, or data flow analysis) is a complete study of existing data acquisition, maintenance and processing. This means:

- Identifying all data points of entry and cataloging the media by which the data is recorded.
- Tracking the media through an organization, noting where it is copied, where data/information is extracted, where changes can be made, where deletions can occur, etc.
- Observing and recording the creation of new media which carry data/information, e.g., reports.
- Following these new media, treating them as above.

With wisdom borne from numerous IFAs, the following is a recommended set of procedures;

- First, begin a study of data dictionary packages, or, if you have programmers/analysts who aren't doing anything, build your own data dictionary package. As should be evident from the brief description of an IFA, a lot of data about data is generated by this study. The sooner you have a tool on hand to store the data and analyze it the better.
- Begin your inventory with a well-documented area. Typically, this might be forms, files or reports. Experience dictates that entry forms are a good place to start (unless they are not well documented). The main things you will want to document for a data entry form are form name/number, data element names, formats, and flow history.

For the flow history, draw a "flow" chart with a "node" to represent every place something significant can happen to the document such as data extraction, form duplication, data changes, etc.

In addition, you may want to document other information about a form. This could include frequency of use, form supplier, storage locations, privacy/security criteria, etc.

- For automated files you will want (in addition to the above) record formats, storage algorithm for records, file names, backup file names, log names, etc.

(Continued on Page 25)

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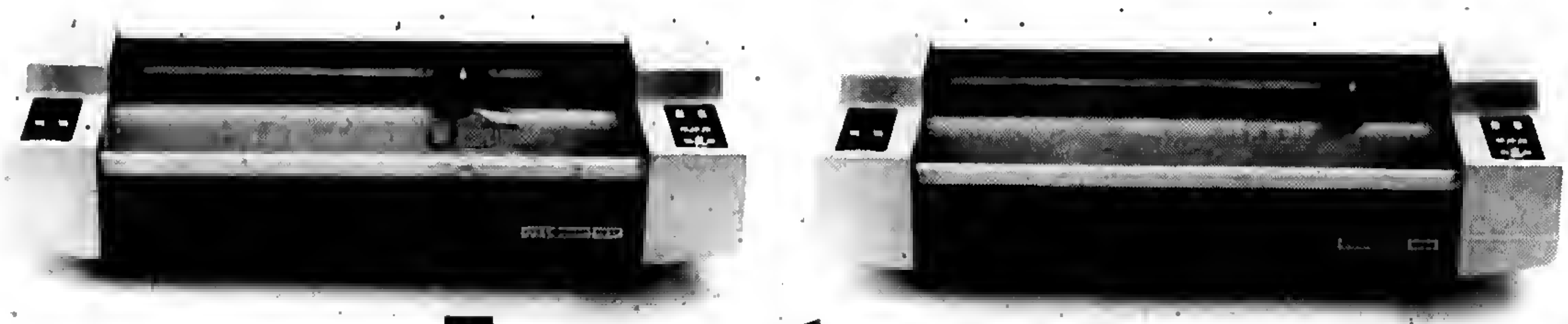

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M6800 Cross-Compiler Bows

CAMBRIDGE, Mass. — PL/M6800 is a cross-compiler from Intermetrics, Inc. that uses the facilities of an IBM 370 to create optimized, directly loadable object code and program listings for execution on a Motorola M6800 or AMI S6800 microcomputer.

The language source is syntactically identical to Intel Corp.'s PLM, according to a spokesman, but the object code produced is "highly optimized" since the compiler has enough room in the 370 environment to take advantage of nearly every instruction in the microprocessor.

PL/M6800 provides a user-controlled switch that determines whether the generated object code is in the AMI or Motorola loader format. Other user options include the preparation of source code, object code or equivalent assembler level code as well as symbol table dumps, the spokesman noted.

Microprocessor users who want to use the capabilities of PL/M6800, even though they normally have no access to a 370 for the purpose, will find the cross-compiler on both the National CSS, Inc. and General Electric remote computing networks, he continued.

Otherwise, the software is packaged and available for a purchase cost of $1,000, which includes a magnetic tape containing a copy of the cross-compiler and all associated library routines, a user's manual, language reference manual and product maintenance for a year.

Intermetrics is at 701 Concord Ave., Cambridge, Mass. 02138.

Data Administrator Leads Organization Into DBMS

(Continued from Page 24)

- Extend your study beyond the computer room. Typically, substantial data/information never finds its way to the computer. Starting with entry forms should avoid the trap of making this just a DP study.
- Enter your "meta-data" into a data dictionary.
- Resolve (identify and record) synonyms. They come in several flavors; data elements with the same name and same meaning; data elements with the same name and different meanings (watch out for these); and data elements with different names and the same meaning.
- Analyze data flows. You will probably identify the source of some of your information problems (e.g., unsynchronized maintenance). Fix these.

You have now demonstrated the value of data administration to management and are now ready for bigger and better things.

Robinson is an independent consultant. S.L. Robinson & Associates is in Morrisville, Pa.

Basic Available On IBM Series/1

(Continued from Page 23)

lease supports files on diskette only; disk file support will be available later this year, according to a spokesman.

Character strings controlled by Basic/1 instructions may range up to 255 characters, he added. Output formatting is provided in the PRINT USING statement; a PICTURE-type format is specified so formatting of a print line is "relatively simple," he said.

Both floating-point and integer numeric variable data types are allowed. Both types have ranges comparable to the double-precision ranges of the Series/1, the spokesman claimed.

Clause Addition

Another extension beyond the proposed Ansi standard for minimal Basic supports the addition of the ELSE clause to the IF statement. Programs can use multiple statements after the IF . . . THEN . . . ELSE construction, GCE noted.

License fees for the single-user diskette-based version now available is $1,800 per CPU. This fee can be applied as credit toward the purchase of the single- or multiple-user disk-based versions when they become available.

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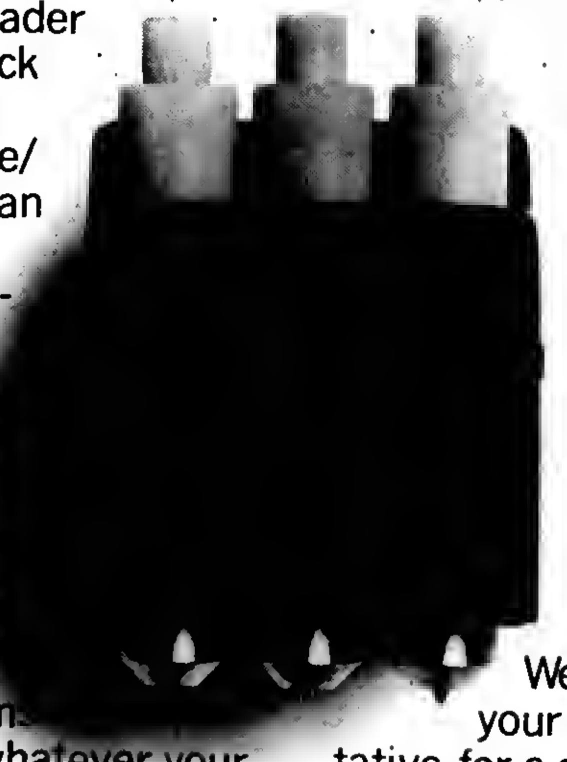

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CPEUG To Blend Technical, Managerial Topics

By Don Leavitt
CW Staff

NEW ORLEANS — The 13th meeting of the Computer Performance Evaluation Users Group (CPEUG), hosted by the U.S. Department of Agriculture, will be held Oct. 11-14 at the Fountainbleau Hotel here and all interested people are welcome, according to program chairman Dennis M. Conti of the National Bureau of Standards (NBS).

Founded in 1971 by the U.S. Air Force and now sponsored by NBS, CPEUG provides a forum for DP professionals actively involved in improving the efficiency and effectiveness of computer facilities.

Although the group has its roots in the federal government, it welcomes participation from the private sector.

In common with many performance-oriented conferences, this meeting will include workshops focusing on user experience with measurement, optimization and simulation tools and techniques. Vendor presentations will provide insight into current products.

Last year's major innovation — discussions of management-oriented issues — has been integrated directly into the main line of the CPEUG '77 program. Tutorials in performance fundamentals — another innovation last year — will be back again this year, Conti noted.

This year, CPEUG will experiment with a program structured around the three phases of a DP project's life cycle. The first afternoon's sessions will relate generally to the requirements phase of a project and will concentrate on workload definition.

The second day, concerned with the acquisition part of a project, will cover computer system acquisition in the morning and on-line system evaluation in the afternoon.

Sessions on the third day, centered on performance measurement in the morning and prediction methods after lunch, will be most pertinent to the operations phase of a project. The conference will adjourn early the next day after a discussion of future DP systems.

Keynote speaker this year will be A.G.W. (Jack) Biddle, president of the Computer & Communications Industry Association. Session chairmen will include Terry Potter from Bell Labs, Norris Goff of the Department of Agriculture and Thomas F. Wyrick of Fedsim.

Registration fee for the conference is $40, payable in advance (until Sept. 30) or at the door. Checks made out to CPEUG should be sent to CPEUG, c/o U.S. Department of Agriculture/Nocc, P.O. Box 60900, New Orleans, La. 70160.

Independent Has Sort For Interdata Minis

DEARBORN HEIGHTS, Mich. — An independently developed sort package for Interdata 32-bit systems, Kimsort from Northware is up to five times quicker than competitive Interdata sorting routines, according to the vendor's claims.

Kimsort is a disk-oriented sort for use with Ascii or Ebcdic files that supports both ascending and descending sequencing on "virtually any number" of key fields, Northware's spokesman said.

Although it can be used in stand-alone batch or interactive operations, Kimsort can be treated as a callable subroutine from Fortran, Cobol or Assembler language application programs.

The package also provides a facility for blocking/deblocking of magnetic tape and contiguous disk files. This is a feature not currently provided by Interdata-supplied software, according to Northware.

Kimsort costs $500 and is available now from Northware through P.O. Box 363, Dearborn Heights, Mich. 48127.

'Polaris' Eases Writing Of IBM 32 RPG-II Code

DENVER — The Polaris package, from Polar Dynamics, Inc. allows the user of an IBM System/32 to generate RPG-II programs from a single key-word-oriented coding form.

The user need be neither a skilled programmer nor high-level computer expert, but should have a basic knowledge of the hardware, a spokesman said.

The user still has to "tell" the system the input with which it has to work, what output is desired and what logical processing is required, but the single coding form is much simpler than the "half dozen or so" sheets normally used in creating RPG-II programs, he said.

The software is available in both a basic single-file version and a more complex one to work with multiple files. Both versions support record selection by user criteria, file merging and creation, file updating and report generation, the spokesman added.

Once the Polaris parameters are entered, the system proceeds without further operator intervention through a compilation and, if the user wishes, an attempted execution of the generated program.

Already installed at several user sites, Polaris costs $1,500 for the single-file version and $2,000 for the multiple-file implementation.

Polar Dynamics is at Suite 203, 5777 E. Evans Ave., Denver, Colo. 80222.

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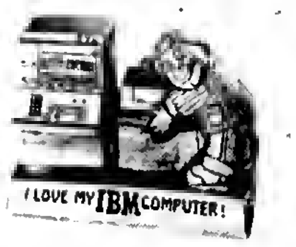
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'SCSS' Supports On-Line Statistical Procedures

CHICAGO — The SPSS Conversational Statistical System (SCSS) from SPSS, Inc. is described as a fully conversational statistical and tabulation system for users of IBM's Time Sharing Option (TSO) on 360/370 mainframes.

The software was designed for files with many variables and up to "several thousand" records, according to a spokeswoman.

SCSS includes six major procedures. Frequency tabulations, n-way cross-tabulations and descriptions of subpopulations including means, sums, standard deviations and variances are featured, she said.

Correlations and partial correlations are also part of the package, as is multiple linear regression with forward, backward, true stepwise and direct solution methods.

The system's functions are triggered by user responses to questions. The user can select one of three styles of prompting — verbose, normal or terse — or escape the prompting sequence entirely and preemptively specify answers to the questions, allowing a complete set of results with each user command.

Whenever a user is unsure of what a question means or what answer would be most appropriate, a HELP command provides a complete explanation, the spokeswoman noted.

The system is fine-tuned in its operation through the use of several variables, she claimed. The user may create new variables from existing ones by writing Fortran-like statements, she noted.

SCSS can be used in conjunction with the original batch-oriented SPSS package.

Currently implemented in IBM OS and OS/VS environments, SCSS is also being adapted to other systems and other mainframes. A VM/370 version designed for use with the Conversational Monitor System (CMS) is expected in November.

SCSS can be licensed for $4,000 annually, with discounted prices available for tax-exempt and academic organizations. SPSS, Inc. is at Suite 1234, 111 E. Wacker Drive, Chicago, Ill. 60601.

Package Spools 3/12 Print Files

SANTA ANA, Calif. — Users of IBM 3/12s can spool printer output to temporary disk storage if they have the Spool/12 software and a printer from Business Systems Technology (BST), according to the vendor.

By providing an access route to the disk storage and then from there to the printer, Spool/12 is said to increase throughput by 25% or more.

An interrupt-drive routine, the package is described as identical in operation to the Spool/8 and Spool/10 packages BST still offers for other models of the IBM 3 line.

In addition to overlapping process-bound operations, Spool/12 enables the user to control the printing operation itself. Through commands entered on the CPU's data/-address switches, printer output can be temporarily halted, cancelled or repeated in its entirety, a spokesman said.

The package does not require either IBM's dual programming support nor a console typewriter. It requires at least 5.5K bytes of memory and a BST 1,200-, 750, 550- or 400 line/min printer. Either BST or IBM disk drives can be used with the program.

Spool/12 rents for $99/mo, but lease plans of one- two- or three-years and purchase plans are also available, according to BST.

The company is at 3015 Daimler St., Santa Ana, Calif. 92705.

Operating System Links OP-1 Programmable Units

WOODBURY, N.Y. — Four OP-1 user programmable terminals from Ontel Corp. can be attached to and share a disk storage system if the configuration is supported by Ontel's "hard disk" operating system (HDOS/80), according to the firm.

The system supports a named file structure including dynamic allocation/deallocation of disk space. Sixty-four private user file catalogs as well as a single share catalog can be supported, Ontel said.

The system also includes a device-independent I/O subsystem, according to a spokesman.

Under the file system, the users can work with read-only shared files or with read/write access including lockouts at the record level to avoid updating conflicts, he said.

Utility routines packaged with HDOS/80 include facilities for file copy, delete, rename, print and erase operations and a program editor.

The entire operating system package is free to users of Ontel's terminals, the company noted from 250 Crossways Park Drive, Woodbury, N.Y. 11797.

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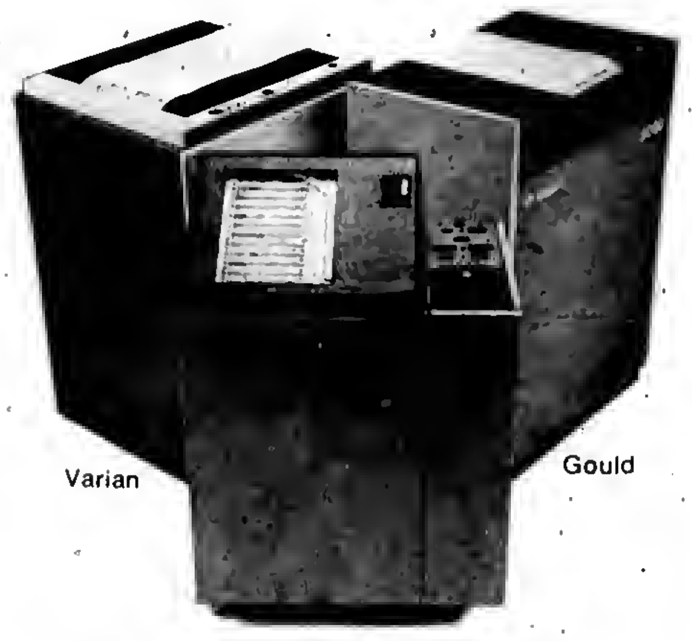

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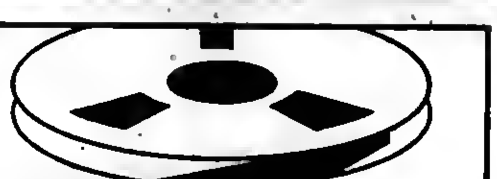

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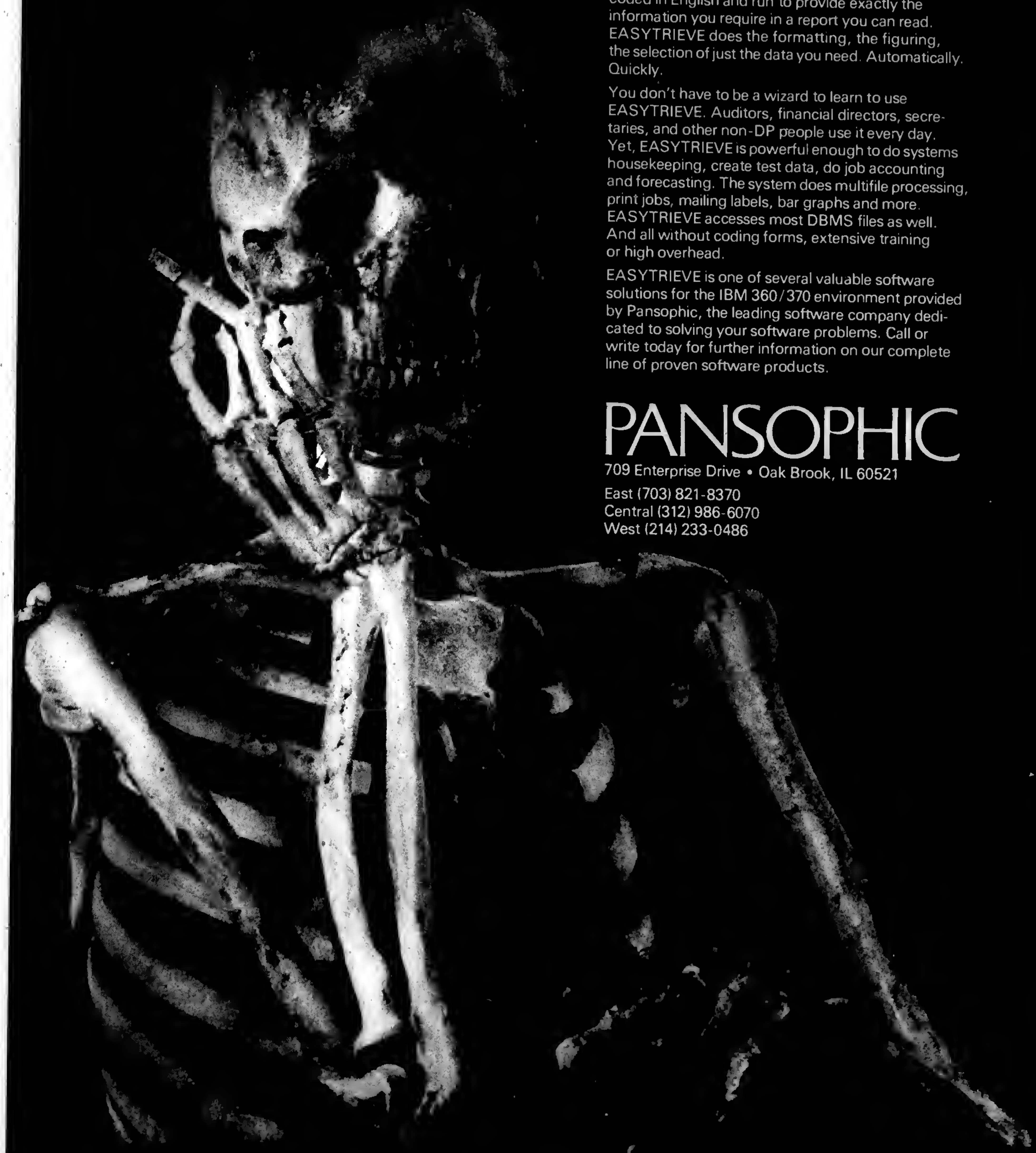

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With Distributed Processing

Protocols Key to Communications Future

By Arthur Lynch
Special to CW

The advent of distributed processing networks and use of data communication as a medium for sharing processing resources has created a need to easily communicate via phone lines between remote processing systems or, more specifically, to communicate between remote operating systems.

This gives a computer user in one location direct access to the resources of a processor at another location. There are many ways this capability can be used. Some typical ones are:

- Remote job entry (RJE).
- Access to various service bureaus via a data link.
- Sharing or accessing remote data bases.
- Providing data to a remote processor.

There are two necessary requirements for implementing this capability— the hardware to interface and control a data modem and a line protocol to control the data transfers.

Vendor	Interactive Terminal Protocols	Batch Terminal Protocols
IBM 360/370	2741, 3270, 2260	2780/3780, Hasp-II Workstation
Univac	Uniscope	1004, DCT 1000, 2000, 3000
HIS	VIP-7700	G-100, DN-700
Burroughs	TC-500	TC-3500
Control Data Corp.	—	UT-200

Some Standard Line Protocols

The hardware requirement is well understood and, relatively easy to obtain. The proper line protocol is not so easy.

The definition of protocols, also called line procedures or line disciplines, can be stated as "a predetermined dialogue scrupulously maintained by both ends of a communications data link." The procedure consists of an interchange of characters or character sequences that guarantees control and integrity of message transfers.

Below is an example of the most standard line protocol, the IBM Binary Synchronous line procedure. A typical transmitter/receiver dialogue includes the following steps:

1. The transmitter first issues an inquiry.
2. The receiver responds positively.
3. The transmitter then transmits text.
4. The receiver continues to respond positively. (If errors were found in the transmission, then a negative acknowledgement would have occurred and the message block retransmitted.)
5. This process continues until a mutually understood end sequence occurs.

There are a large number of line protocol designs that are optimized for all types of system criteria, such as:

(Continued on Page 32)

BST Substitute for IBM 3277 Compatible With System/3

SANTA ANA, Calif. — The Business Systems Technology (BST) division of Memorex Corp. has announced the BST/1377 CRT station as a functional replacement for the IBM 3277-2 CRT.

The BST/1377 is fully compatible with the IBM System/3, according to a BST spokesman.

The BST/1377 keyboard and CRT is used for entering and displaying alphanumeric data. By utilizing either the keyboard or the optional light pen, the operator can enter, display or manipulate data on the screen.

The screen displays 24 lines of 80 characters (1,920 characters).

For readability, the 1377 uses a 7 by 8 dot matrix to display the CRT's 89-character set on a 15-in. diagonal screen. In addition, a tiltable screen allows the operator to adjust the viewing angle for visual comfort, BST said.

Other highlights of the station include nonglare keys and CRT, a 20% faster screen refresh cycle for reduced flicker, a line and a column indicator on the 25th line and a reverse video cursor, the spokesman said.

The BST/1377 attaches to the System/3 models 4, 8, 12 and 15 via appropriate CPU features, he added.

The unit is available on a monthly rental plan and on one- and two-year leases. On a one-year lease, it costs $90/mo with maintenance.

The unit can also be purchased for $3,600 with maintenance priced at $15/mo per terminal, BST noted from 3015 Daimler St., Santa Ana, Calif. 92705.

Eotec Adds Breakout Unit

SANTA CLARA, Calif. — Eotec Corp. has introduced the EIA Breakout, a troubleshooting unit that offers two methods of determining the signal interface between terminal equipment and modems.

The first of these methods uses an LED display of 17 signals that illuminate when positive. The second uses test points that provide access to each EIA oscilloscope or other test equipment.

Using an EIA RS-232-type interface, the EIA Breakout can be installed in series between all terminals or terminal controller units and modems, the manufacturer claimed.

Troubleshooters can open any EIA signal with 21 subminiature switches and use the test points for crosswiring to any other EIA signal or to a positive voltage source.

The $175 unit comes with three feet of cable from Eotec Corp., 2595 Martin Ave., Santa Clara, Calif. 95050.

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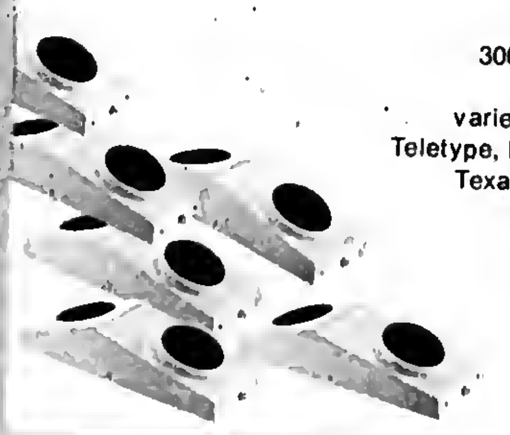

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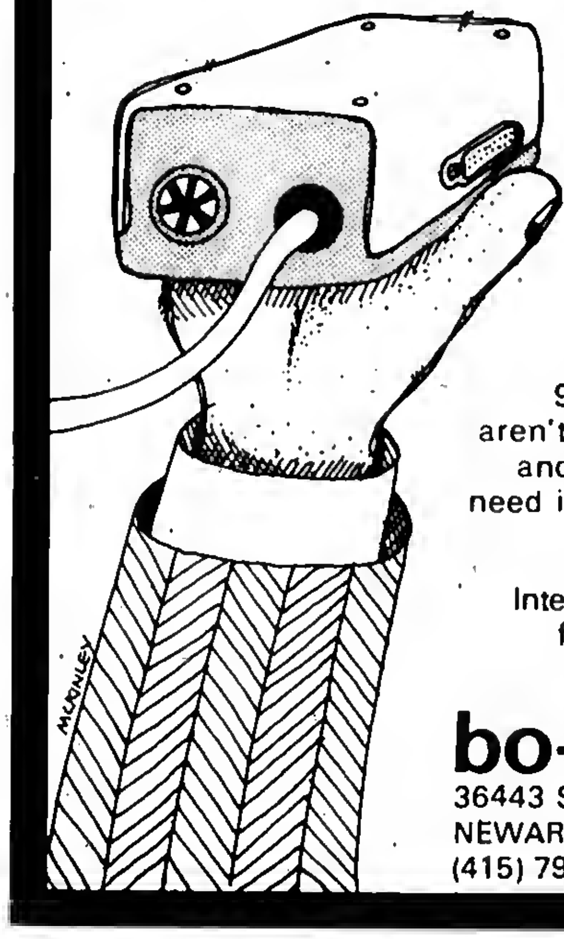

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Canadian Group Introduces Basic Glass Teletypewriter

OTTAWA — Vucom 4, a CRT terminal, has been introduced by The Computer Communications Group of the TransCanada Telephone System (TCTS) to meet the computer communications needs of business and industry for a basic glass teletypewriter.

Rates will be $115 on monthly rental and "significantly less" on two- three- or five-year Extended Term Rates for Candian users, according to a spokesman.

Quiet Operation

Designed as a basic conversational terminal with keyboard/CRT unit, Vucom 4 is said to feature quiet operation and high reliability. It can operate over the switched network or on private line facilities, TCTS said.

Compatible with most teleprinters operating at speeds from 30- to 120 char./sec, the Vucom 4 communication mode is asynchronous up to 9,600 word/min. The terminal display provides 1,920 characters in 24 lines of 80 characters each.

Additional features of Vucom 4 include the 13-key numeric pad for high-speed data entry, a multipositional cursor that can be controlled by the operator or the host computer, and upper and lower case Ascii character sets, the spokesman said.

Vucom 4 can be purchased outright for about $2,000. The Computer Communications Group is located at 160 Elgin St., Ottawa, Canada.

Protocols Key to Future

(Continued from Page 31)

- Transmission mode (asynchronous/synchronous/Synchronous Data Link Control.
- Types of transmission (full-duplex, half-duplex).
- Interactive terminal applications.
- Remote batch applications.
- Conversational services, TWX, Telex, etc.
- Specific terminal device characteristics.
- Throughput requirements.
- Error control and procedures.
- Data transparency requirements.

Host Emulation

The most popular method of implementing a protocol for communicating with a particular remote processor is to emulate or simulate a standard line protocol for that processor. This allows access without the need to program and debug a nonstandard line protocol in the host, which can be a lengthy, painful process.

For example, an easy way for a remote system to communicate with a Honeywell Information Systems CPU is to use the G-100 line protocol. The G-100 is a remote batch terminal in the HIS product line.

Conveniently, all of the major mainframe manufacturers support some kind of standard line protocols that can be used. Most have several for different types of applications. The accompanying table shows some important ones.

The table contains protocols for two different classes of applications, interactive and batch. An interactive application would be a data entry/data base inquiry/response requirement with CRT and/or Teletype input, requiring fast response times (1- to 10 sec) typically.

A batch application would be the RJE application that tolerates long turnarounds and is not serviced in real time by the central processor. Job turnarounds can vary between minutes and hours. The protocol emulation must be selected to suit the application.

Second Point

The second important point after the proper protocol has been selected is the assurance that the emulation software runs under the local operating system. Software that runs under the Data General Corp. AOS, RDOS or RTOS combines the higher level language support, resource management features that can be used in conjunction with the line protocol to a remote processor.

For example, in a dual programming RDOS environment, the system could operate as an RJE station in foreground and perform Fortran compilations, time-share Basic or execute an application program in the background.

Two Simulations

There are two protocol emulations supplied by DG that run under AOS, RDOS or RTOS. They are IBM 2780 RJE station (RSTCP, RJE80) and IBM Hasp-II workstation (Hamlet).

The IBM 2780 product is a simple RJE or remote batch terminal that supports a single job stream and consists of a remote hard-wired terminal with a printer and card reader. The IBM 2780 line protocol is supported at speeds up to 9,600 bit/sec.

The Hasp-II workstation is a higher performance RJE terminal that usually consists of an IBM 360/20 configured with a variety of peripheral devices. The Hasp line protocol supports multiple job streams, multileaving operations of up to seven input peripherals and seven output peripherals concurrently. The Hasp protocol operates at line speeds up to 56 kbit/sec.

Third-Party Options

Third-party vendors that supply protocol emulation software are also available. For example, Gamma Technology Corp. in Palo Alto, Calif., supplies a number of emulator packages that operate under RDOS — IBM 3270 emulation, Control Data Corp. UT-200 emulation and Univac 1004 emulation.

As a last resort, the user may be compelled to design a new protocol or develop an emulation to satisfy a unique system requirement.

Future requirements point to a continuing need for protocol emulation software to maintain compatability with new products and strategies or to provide access to new communications facilities like packet-switching networks.

Lynch is manager of communications and terminal marketing at Data General Corp. in Westboro, Mass.

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Bank Installing Statewide Net and Diagnostics

SEATTLE — A management control and diagnostic system that isolates data communications problems remotely is currently being installed as part of a dedicated on-line banking system at Seattle-First National Bank. When operating early next year as part of the total system, Seattle-First will become one of the nation's first commercial banks to offer statewide, on-line banking.

The system, which went into its pilot phase last month in six branches, will then be extended during the next several months to the balance of the bank's 166 branches. Seattle-First, the nation's 21st largest bank and an innovator in electronic banking, will be able to remotely diagnose and monitor data communications and data transmission in branches throughout the state.

The network diagnostic control system, as well as modems and support data transmission equipment in each branch, is supplied by General DataComm Industries, Inc., Wilton, Conn. Called Netcon-5, it will provide Seattle-First, from its computer center in Seattle, with systems control and monitoring for all stations in the bank's on-line network. As part of its on-line system, Seattle First is also installing at its branches Incoterm Corp. teller and administrative terminals and central controllers.

From the central location, Netcon-5 gives the bank a window into its analog and digital communications network. The equipment was designed to perform the two basic functions necessary to maintain on-line operations of polling and distributive DP systems. First, it identifies that portion of the system which is malfunctioning and then provides the capability to restore operations through alternative facilities.

Problems Isolated

Besides automatic diagnostic test and control functions, Netcon-5 isolates local problems when they occur. Its automatic scanning feature monitors the bank network, providing on-line diagnosis without operator intervention. When the system operates without problems, personnel are free to perform other tasks.

Should a failure occur, the General DataComm system alerts the operator with an audible alarm and a message on the console's screen. The operator, in turn, can then isolate the problem and, when possible, use restoral features to correct the failure with a minimum of downtime.

Some of the malfunctions at the branch location that are reported to the central system are no response to its command, loss of data terminal ready signal, loss of carrier from the central site and loss of data set ready signal. Based on its diagnostic capabilities, Netcon-5 can then perform such restoral features as dial backup of four-wire telephone lines, hot transfer for all remote modems upon command and modem streaming detection and disabling.

Netcon-5 consists of a microprocessor-oriented diagnostic and control system that operates out of the main channel band. It allows off-line testing and on-line telemetry functions by scanning all lines and modems on a continuing basis. At Seattle-First, Netcon-5 addresses and monitors General DataComm 2,400 bit/sec modems at each branch along with multipoint diagnostic master units which operate in conjunction with each modem and permit the diagnostic, monitoring and restoral features of the system.

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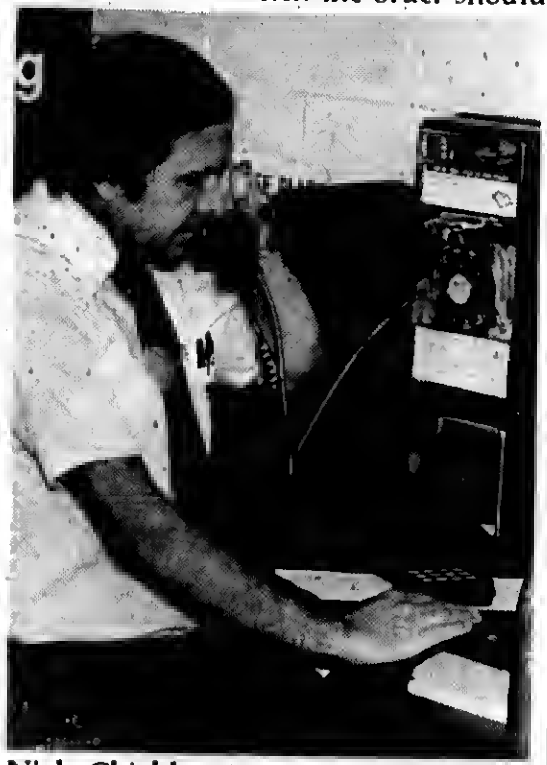
Keypad, S/7 Keep Orders Bubbling

DETROIT — In a phone booth 12 miles from the Detroit Coca-Cola Bottling Co. office, Nick Chichkan, a company salesman, dialed a number. In the Detroit Coca-Cola office, a small light flashed on an IBM System/7 and Chichkan was answered with a high-pitched tone.

He punched a series of numbers into a Port-A-Tone keypad that converts the rotary dial to a Touch-Tone telephone and was answered by a bleeping sound. The Port-A-Tone is made by Interface Technology of St. Louis, Mo., and costs about $75.



Nick Chichkan uses a compact Port-A-Tone unit to access the System/7.

In less than 30 seconds, without speaking a word, Chichkan ordered soft drinks for a grocery store. He gave instructions on when the order should be delivered and noted that empty bottles needed to be picked up at the store.

While Chichkan was placing his order, seven other account driver/supervisors were simultaneously placing other orders.

The Detroit Coca-Cola Bottling Co. is reportedly one of the first in the soft drink industry to use a System/7 to computerize its order entry system from the salesperson in the field to processing the order for delivery. The result for Detroit Coca-Cola and its customers is faster, more accurate order processing and improved service, according to a spokesman.

The System/7 can detect the sounds made by a Touch-Tone telephone and translate those sounds into specific information. Because of this ability, Detroit Coca-Cola's 34 salespersons can call the System/7 directly on one of its eight phone lines.

After the CPU answers a call, the salesperson enters a security code and then a customer code number and all details of the order including product, quantity and delivery date. The System/7 verifies the order total with the saleperson's total; it will not accept orders which do not balance, no matter how many times they are entered.

In addition, the salesperson can send special instructions with an order by entering a specific code. For example, he may tell the CPU to include a note to "stock shelves," "pick up empties," "place advertising" or "expedite."

The System/7 coordinates the order information phoned to it and records it on cards that can be accepted by the firm's Honeywell 1250 mainframe. From there the order is processed and sent on its way.

The previous system required a phone call to a keypunch operator who committed the information to cards, which were gathered four to eight times a day for a batch audit. That batch audit then was hand-checked against the original order. Twice daily, the salespeople would call to verify their morning and afternoon orders.

Warren Ginsberg, DP manager at Detroit Coca-Cola, said "the use of the System/7 saves our sales staff alone 242 selling hours per month, time that is now used to service customers and increase sales. The time savings of computer personnel is even greater.

"In addition, we can handle at least twice as many orders as before . . . and handle them faster with greater accuracy. This has allowed rapid company growth," he added.

Warren Ginsberg, manager of DP, uses the system for handling orders.

Build Your Own

SEATTLE — Thinking of building your own modem? "The Northwest Computer Club News," a publication of the Northwest Computer Club here, recently ran an article by Roger Modeem telling hobbyists how they can build such a device based on the Motorola MC6860 modem-on-a-chip.

The article, with schemata, discussed the various parts needed to build such a modem and noted it can be built for less than kits.

All is not glitter, however, as the article concluded with: "This circuit and article are offered as information only. No attempt is made to defraud, defang, defrock or discredit the Bell Telephone System . . . "

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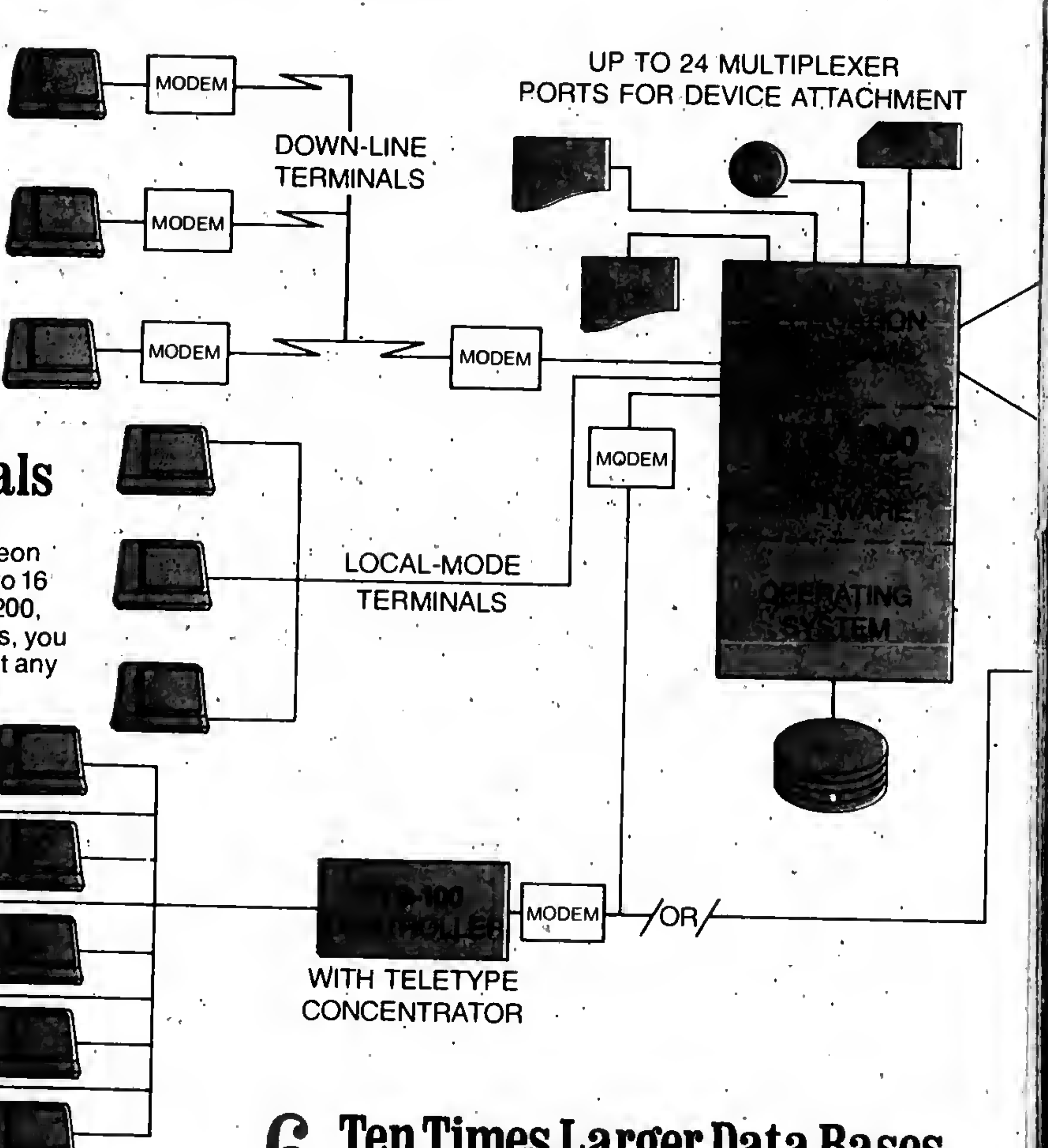
In the past three months, Raytheon has been busily adding more and more capabilities to its PTS-100 intelligent terminal and PTS/1200 distributed processing systems. The reason: to give you more and more reasons to keep buying Raytheon.

Here are ten good ones. Watch this space in coming months for at least five more.



1. Downline Terminals

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2. Local-Mode Terminals

A long-standing capability of the PTS/1200, and one that only Raytheon offers. It means you can attach up to 16 terminals in local mode to a PTS/1200, at distances up to a mile away. Thus, you get a network in local mode without any TP requirements.

3. Teletype Concentration

Announced two months ago, after more than a year of user operation, this unique feature lets you add teleprinters to the same transmission lines as your 3270-type terminals, with maximum performance and data rates preserved. Know anyone else with this $80 a month feature?

4. Immediate Deliveries

Raytheon has always been known for prompt delivery. We know that when you need it, you want it. There are five new capabilities described in this ad. All five will be in production by June 30th. This year—1977.

5. Lowest Prices

A major attraction of Raytheon alternatives to 3270/3790 has been pricing. Even with IBM's recent price reductions, our pricing schedules permit you to obtain far more capabilities than IBM offers—at rental or purchase rates that are up to 27 per cent below IBM.

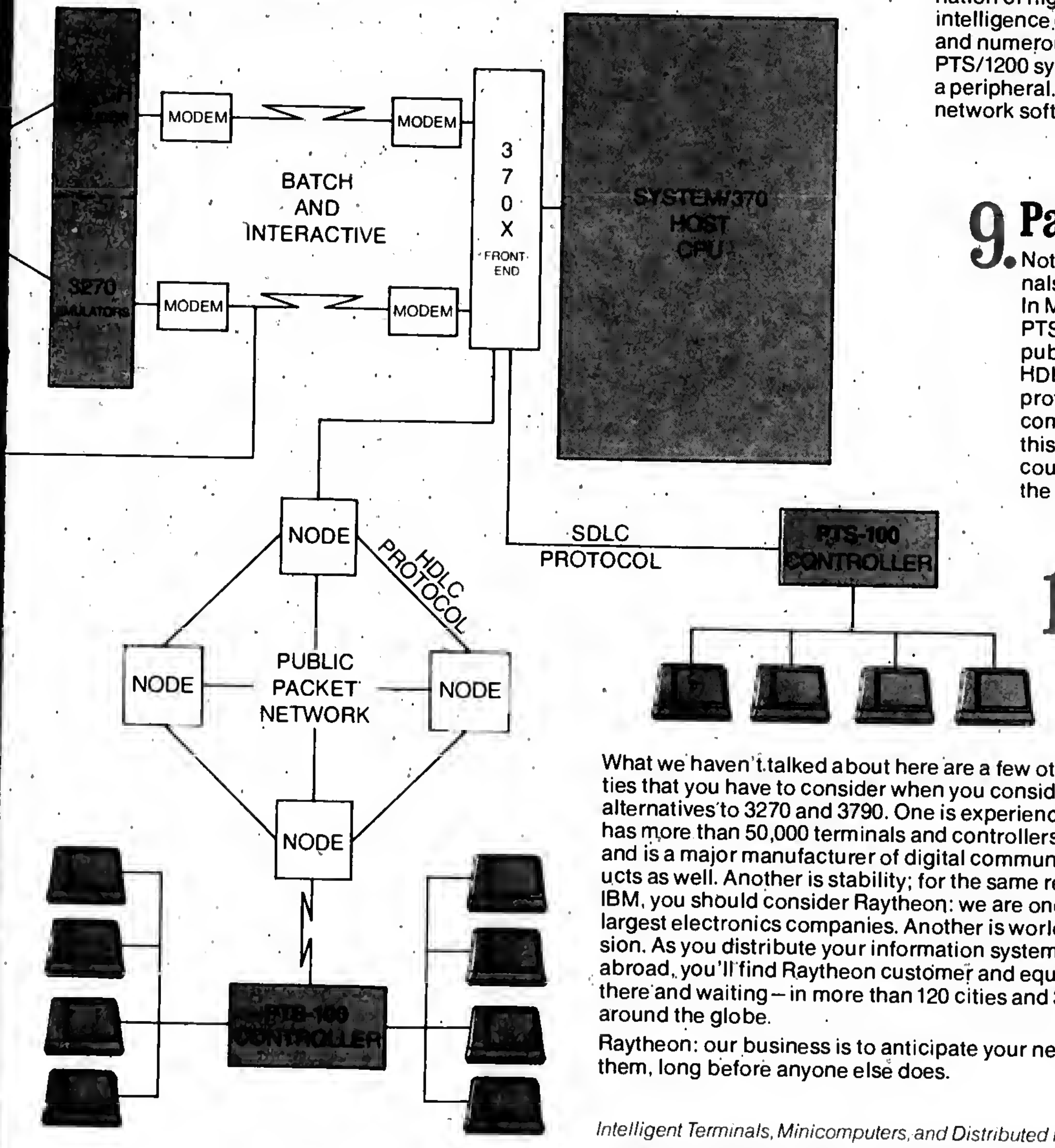
6. Ten Times Larger Data Bases

In a distributed processing system—anyone's distributed processing system—you need disk storage capacity adequate to handle the workloads. Raytheon has just announced a new 320-megabyte disk capacity for its PTS/1200 system. That's 10 times larger than the 3790's.

good reasons to choose Raytheon.

7. Simultaneous Interactive and Batch Communications

Two months ago, Raytheon demonstrated what no one else has—true 3270 concurrency. Our 3270 emulator lets you communicate interactively on a transaction basis with your host CPU. Our 2780/3780/HASP emulator package lets you—at the same time—communicate in batch mode. What counts about that is immediacy: you can do both right now, without any additional applications or front-end software development. And especially, no VTAM or NCP hassles.



8. Total Programming Freedom

This long-standing feature of Raytheon systems needs repeating. Because of the combination of high-level language, very large intelligence capacity, powerful macro routines, and numerous emulators, PTS-100 and PTS/1200 systems treat your host CPU like a peripheral. The result: data networks without network software development.

9. Packet Network Connection

Not with TTYs or ASCII-based terminals, but with 3270-type CRT devices. In March, Raytheon demonstrated its PTS-100 terminals operating on a U.S. public packet network under both HDLC line protocol and X.25 device protocol. We are the only major U.S. company operating such terminals on this international standard in other countries. Now we have it for you in the U.S.

10. SDLC Operation

And yes, every system in the PTS-100 family operates under SDLC protocol if you want it to. Or binary synchronous. Or HDLC. Or 1006. Or 2848/2260. Or Uniscope. Among many others.

What we haven't talked about here are a few other capabilities that you have to consider when you consider Raytheon alternatives to 3270 and 3790. One is experience—Raytheon has more than 50,000 terminals and controllers in use today, and is a major manufacturer of digital communications products as well. Another is stability; for the same reason you like IBM, you should consider Raytheon: we are one of the world's largest electronics companies. Another is worldwide dimension. As you distribute your information systems here and abroad, you'll find Raytheon customer and equipment service there and waiting—in more than 120 cities and 35 countries around the globe.

Raytheon: our business is to anticipate your needs and meet them, long before anyone else does.

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Terminal Transactions

Vendor Uses Mini to Automate Remote Tests

MAHWAH, N.J — Remote field testing of data communications terminals has been automated by Western Union (WU) Data Services through a computerized diagnostic system. that reportedly will provide faster service to its customers.

W.U Data Services maintains a line of 10-, 30- and 120 char./sec teleprinters and CRT terminals. The automated system enables the company's field service engineers to order up diagnostic routines and terminal tests from a Hewlett-Packard Co. 2113 minicomputer and devise their own tests for computer execution on customer terminals.

Automated field diagnostics and testing represents an enhancement of the company's Termicare system, a terminal maintenance service that combines nationwide field service with a centralized customer-service. At the heart of the Termicare system is the Termicare Center, which receives calls for maintenance from anywhere in the U.S. over its toll-free lines.

Here technicians either help the customer restore his terminal to service or dispatch a field service engineer to the terminal site. Terminal problems are monitored by the Termicare Center.

Previously, automatic test capability consisted of test tapes being transmitted back and forth between Termicare technicians and field service engineers operating at customer's terminal. Alternately, the field service engineers called upon terminal controllers at the Termicare Center for the transmission of "canned" test messages.

The 2113 processor system eliminates both and simulates more exactly the computer timing of a customer's system, according to a spokesman.

Operated on the minicomputer, the system enables field service engineers to perform terminal testing on the company's entire product line. The minicomputer is said to contain all the special characteristics of each terminal type and generates tests for their special characteristics.

Programs available in the system's library of test routines include:

- Tests specified by the manufacturers of the company's products.
- Tests historically used and found valuable.
- Tests developed to check special terminal configurations.
- Tests initiated by the field service engineers.

Field service engineers can vary the test parameters at will; they can request the number of times they want a test to be run or a change in the line length of characters, transmission rate, code, parity, minimum line length and other characteristics.

This flexibility reportedly enables them to handle unusual terminal problems that are not covered by standard tests.

For example, conducting a store-and-forward test, a service engineer can store a message of any character combination up to 240 characters in the minicomputers. The message will be sent back to the terminal under test by command from the service engineer any number of times, the spokesman said.

The system spots parity errors and prints out "Parity Errors" as well as the bit configuration of the character received in error. More comprehensive data interpretation is planned for the future.

The 2113 mini keeps a running record of all calls it receives and records all test data. It logs in the identity of the user, the duration of the testing and the types of tests requested, providing a means to monitor the usage and effectiveness of the system's diagnostic aids and terminal tests.

An HP 2645 CRT terminal acts as the 2113 console. In addition to a multiplexer, the computer system has four auto-dialers.

The auto-dialers enable field service engineers to instruct the minicomputer to call back customer terminals so they can check the answering side of the terminals, the spokesman explained.

Micom Offering Rate Changer

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced a 50/56 kbit/sec rate changer as a special implementation of its Model 720 digital data multiplexer.

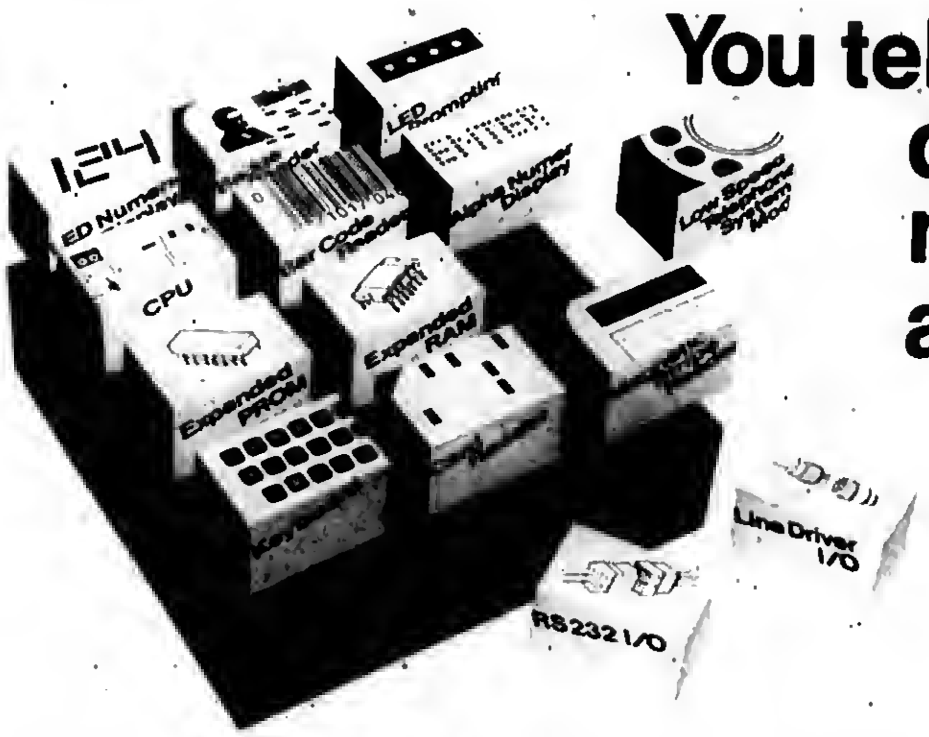
The rate changer permits tandem interconnection of digital circuits operating at 56 kbit/sec and analog wideband circuits operating at 50 kbit/sec with Bell 303 or equivalent modems, according to the firm.

The Micom hardware device reportedly can also be used to change rates between any two wideband data transmission speeds of 40.8-, 48-, 50- and 56 kbit/sec.

The higher speed composite interface operates synchronously at 56 kbit/sec using a CCITT V.35 interface, while the synchronous channel interface operates at the 50 kbit/sec speed using a Bell 303-type interface, Micom said.

Rate changing is increasingly becoming a necessity in the installation of long-distance, high-speed transmission links, the company claimed.

The 50/56 kbit/sec rate changer is supplied in pairs at $2,040 per end from the company at 9551 Irondale Ave., Chatsworth, Calif. 91311.



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All models include an 8080 microprocessor; the user can program terminals to provide customized input, output and processing of data. In addition, programmability aids in prompting the user through entry steps; validating data and enables off-line or on-line operation.

EPIC DATA terminals weigh only 8½ pounds. They can hang on a wall, be placed on a desk, and are easily exchanged during maintenance.

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flexible. Choose the terminal and options which best meet your application. EPIC DATA terminals can optically read punched badges and 80-column ANSI cards. User-defined keys are available for inputting variable data. Key entry data or time of day is displayed and LEDs are available for prompting.

Terminals can be configured to scan bar codes and magnetic stripes or accommodate other peripherals through RS232 ports. Display options include additional numeric displays, up to 15 LEDs for prompting and a 32-character alpha/numeric display. A low-speed modem and serial asynchronous or synchronous communications ports with either RS232 or line driver I/O may be added. Both PROM and RAM memories are expandable.

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals.

TOPS supports freight car classification at Southern Pacific's Bayshore Yard, just south of San Francisco. Data on car movement is supplied by 545 terminals linked by telephone and microwave to dual IBM computers.

TOPS Saves Southern Pacific $6 Million Yearly

The Total Operations Processing System (TOPS) of the Southern Pacific Transportation Company keeps track of the 100,000 freight cars that roll over 13,445 miles of railroad. According to railroad president Denman K. McNear: "TOPS is producing tangible recurring savings of $6 million annually."

Terminals in switchyards throughout the vast rail system supply data on car movement to TOPS' dual System/370 Model 168's in Southern Pacific's San Francisco headquarters. From there, TOPS assigns cars to shippers; directs their movements and stores each car's current location. As a train approaches a switchyard, TOPS transmits the "consist": a listing of all cars, their contents, destination and special handling instructions. From this, yard men create a track list which directs switching operations. When a departing train has been assembled, its new consist is transmitted to TOPS.

"We've been installing programmable units of the IBM 3770 Data Communication System at our terminal locations," says J.W. Germany, vice president of management services. "We can perform local switchyard data processing functions as well as computer input-output on the 3770. This integration has speeded up operations in the yards and cut down on errors.

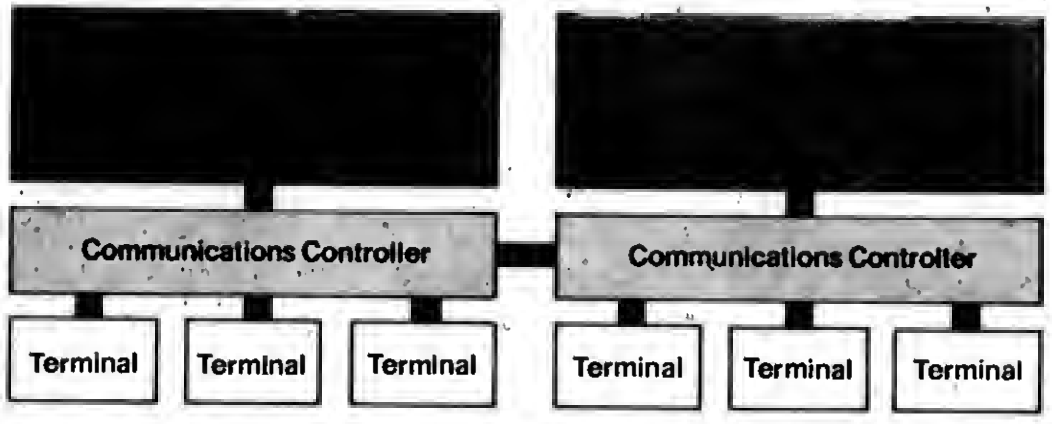
"Overall, there has been no increase in our hardware costs, and TOPS data is more current. The higher data rates of the 3770 make better use of our communication links, resulting in further direct savings.'

"The 3770 has opened the way for continuing enhancement of TOPS. We are currently running a pilot project in which we eliminate the paper waybills which accompany all freight cars. Instead, TOPS supplies required waybill data through the 3770 system.

"This is a substantial change in how we operate, and it holds a lot of promise. We're projecting important gains in personnel productivity, customer satisfaction, cash flow, error control, and shortened time from completion of movement to rendering of the bill."

Adds railroad president McNear: "The TOPS data base has made possible online inquiry of car location for shippers. And it permits better planning and better reporting on all levels of management."

Networking Extends the Reach of Computers



The engineer, visiting corporate headquarters, has a sudden requirement for a mathematical routine resident in a plant computer many miles away. He sits down at a terminal in headquarters—one which normally accesses business applications in the corporate computer—and logs on just as if he were at the plant. The local system senses that he is requesting a program only available at the plant, and routes his request to the computer there.

Similarly, a headquarters visitor to any company location with a terminal can as easily establish a link with an application in the corporate computer.

This mode of computer use is a feature of *networking*, and now a new form of networking is available from IBM under Systems Network Architecture (SNA). Called Advanced Communication Function (ACF), it includes enhancements to both the Virtual Storage operating systems for System/370 and the Network Control Program for the 3705 Communications Controller.

The 3705 can automatically switch a service request at any terminal to an application in any computer in the network. This action is "transparent" to the user, who sees a "single system image" and is not aware of or concerned with the computer to which his work is routed.

ACF provides an architecture which lets the user specify recovery procedures, switching rules, the Initial Program Load (IPL) sequence, emergency reduced-service operation, and communication to and from operators. This structure is provided by the Network Operation Support Program (NOSP)—a programming mechanism by which the user enters his own decision rules and priorities.

Networking with ACF offers great advances in reliability, availability, and cost/performance. Idle capacity can be put to use quickly since a new application can be installed wherever there is room for it. And ACF can greatly improve the economies of such general applications as text processing and interactive training systems, by making them widely available through existing terminals. Similarly, more terminal sites become economical, since each can access more applications.

Tying computers together in a network makes their power more accessible, reliable and economical. It extends their reach to more users and into new application areas.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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NCR Unwraps Largest Interactive 8000

DAYTON — NCR Corp. has introduced the latest model in its 8000 series, the I-8430, which is the largest interactive model NCR has released to date.

The heart of the I-8430 is a 112 nsec CPU that utilizes ECL circuitry, internal transfer-bus architecture and user diagnostics, according to the firm.

Memory available with the sysem ranges from a minimum 128K to 384K bytes. Memory increases come in 64K-byte increments, a spokesman said.

The I-8430 can accommodate NCR's complete library of interactive Cobol programs, he claimed, noting that Cobol programs developed by NCR, its users and by independent software houses for the NCR I-8200 series machines will run on the I-8430 without modification.

System options include two additional trunks to bring the total possible up to three and an integrated disk controller which allows one string of up to eight spindles.

The system can operate with CRTs, card readers with speeds up to 600 card/min, line printers up to 900 line/min and 10M- to 67M-byte disk units with transfer rates up to 885 kbyte/sec.

The basic I-8430 with 128K bytes of memory costs $71,500 and rents for $2,050/mo. A system with CPU, 256K bytes of memory, 10 CRTs, 67M bytes of disk storage capacity and a 300 line/min printer rents for $3,900/mo and sells for approximately $196,000.

NCR also released for sale its 721 communications processor. The processor is already installed in several communications networks.

The processor, although it predates NCR's recently announced distributed network architecture, can be conditioned to conform to the latest NCR architecture, the spokesman said.

Join the Show

WALTHAM, Mass. — Users who bring magnetic tapes to Info '77 in New York' Oct. 17-20 will have an opportunity to see their own reports printed on a Honeywell Information Systems, Inc. Page Printing System (PPS).

The HIS offer applies to users of IBM 360/370, Burroughs 6700, Univac 9700 and HIS Level 66 Series 6000 or Series 2000 CPUs.

Users interested in participating in the demonstration should contact Russ Bishop at HIS, 200 Smith St., Waltham, Mass. 02154, before Oct. 10.

'Independence' Can Liberate User Budgets

By Richard Egan
Special to CW

In an unparalleled technological boom, DP has evolved in two short decades from the wonderful to the commonplace. Computers permeate our society, making it possible for us to do scientific research, manufacture goods, cash checks and even get on junk mailing lists faster and more efficiently. A recent study showed there are more jobs for college graduates in the DP field that in any other except engineering. In short, we take computers for granted.

The one thing professionals in the field cannot take for granted any longer is the increasingly high cost of DP equipment. "Cost-effectiveness" has become the industry's favorite buzz word.

DP managers, faced with greater demands for service and tight budget constraints, are less willing to accept the costly, packaged solutions of single vendors and are becoming more independent in their choice of both software and hardware components.

The independent plug-compatible peripheral industry has developed in response to that growing user independence.

The independent manufacturer, whether his product is tape drive, disks, terminal or main memory, must compete head-on with large, entrenched vendors. The independent manufacturer must deliver better performance at a lower price if he is to survive. That fact can, and does, work to the independent-minded user's advantage. Over $2 billion worth of independently supplied DP equipment now operating successfully in the field represents an almost equivalent amount of savings to the user community.

A good example of the savings available through the acquisition of equipment from an independent is the cost of 512K bytes of 370/145 memory:

	Price	Savings
New from IBM	$192,800	none
Used IBM	$125,000	$ 67,800
Independent (Cambridge Memories 370 Stor/145)	$ 75,000	$117,800

The same 30% to 40% savings holds true generally regardless of the size of the mainframe being upgraded with add-on memory, whether it is a 360 or a big 370/158 operating in a virtual storage environment.

The catch is that if you own your own IBM mainframe or lease it from a third-party purchaser, IBM will not rent additional main memory to you. You have to buy it outright at around $250,000/M byte. If, for example, your need for additional memory is linked to a specific short-term project, the cost is prohibitive.

If your IBM mainframe is rented, you can add memory, but only at the cost of signing a four-year Term Lease Plan and paying extra-use charges. If your projected needs are reduced unexpectedly and you no longer require the extra memory, you're stuck.

Independently supplied expansion memory offers more flexible acquisition terms compatible with your specific long- and short-range planning. Most independent memory can be leased over a variable term or purchased. The fact that your CPU is rented, leased or owned is irrelevant.

In addition, you can easily reconfigure your system upward or downward to meet changing workloads or budget requirements. Independent memory modules may even replace all but the minimum amount of IBM-resident main storage (512K) for major savings on rented equipment.

Extra Budget Savers

In addition to the obvious equipment acquisition savings, independent equipment offers users several other benefits that can have a substantial effect on the bottom line.

Many independent suppliers offer higher density tape and disk storage capacity for faster transfer speeds and better utilization of I/O devices.

Double, sometimes quadruple, capacity main memory modules ranging in size from 512K bytes to 7,680K bytes are available only from independents. These not only improve throughput in many applications, but also allow users to upgrade service without giving up older, reliable and — often — fully depreciated CPUs.

CPU enhancements available from some independent vendors have increased throughput anywhere from 10% to 20% and at costs dramatically lower than acquiring a new CPU.

Energy savings are also more likely with independent equipment. For example, main memory is usually available a year or two after a vendor such as IBM or Digital Equipment Corp. makes its first customer shipments. Therefore, the later-introduced memories can take advantage of more advanced technology.

As an example, the 512K-byte Cambridge 370 Stor/145 memory requires only 1.8 kVA while the same capacity IBM memory consumes 5.8 kVA. Assuming the user pays 4 cents per kilowatt hour and air condition-

(Continued on Page 48)

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Five Suggestions Offered

Data Entry Savings Means People Management

By Ron Henderson
Special to CW

Month after month, users are being bombarded by a parade of new computing products. With the advent of bubble memories and microcomputers we are rocketing ourselves into a world that would startle even Buck Rogers.

But too little attention has been given to the all-too-familiar problem of capturing data to feed the voracious CPUs. Our main focus has been to "solve all problems with hardware." However, the simple fact remains that to continue to make computers work, someone has to depress keys, punch cards, write output tapes or directly enter data.

Let us not forget punched cards were first used in 1890 to tabulate the U.S. census. Now, 87 years later, we're still punching cards. Outside of some optical character recognition applications, the prospects for eliminating hand keystroking is doubtful in our lifetime. Data entry operators, whether centralized or dispersed, will remain a permanent part of any DP operation.

In recent years there have been numerous improvements in data entry systems. "Plain vanilla" has given way to "hot fudge with whipped cream and cherries" systems. These delicious new systems eliminate large numbers of keystrokes and costly errors while transferring many functions off the mainframe.

However, in spite of these new data entry systems the bulk of all data is captured by people. Computers need data entry people, for people have this wonderful ability to scan a disorganized source document, read the most ridiculous handwriting and spot mistakes no computer could possibly detect.

But some operators are more productive than others, so to stretch the data entry dollar a manager must make the best use of his people. Imagine what would happen if all data entry operators started increasing their keystroking rate by 30%. Imagine what that would do to the budget.

It probably isn't going to happen, but still we have to ask ourselves how is it some people can actually keystroke at 18,000 strokes per hour while others can only do 8,000. Why are there such wide disparities among people using the same source documents and systems?

More importantly, how can we help data entry people be more productive and happy . . . and in the process stretch our budget?

Here are five suggestions for increasing data entry productivity:

- Aptitude — Anyone who selects an operator with good experience over a person with certain high aptitudes may be sorely disappointed. With good hand-to-eye coordination, fast finger dexterity and a high degree of numeric and verbal reasoning, an inexperienced person can outperform the experienced operator with less aptitude within three months. Unfortunately, you can't train someone to have better aptitudes. Either you were born with them or you weren't. People with great attitudes, good attendance records and poor aptitudes can work as hard as they want, but they can never meet the level of performance of the people with the right aptitudes.
- Attitude — Operators can sometimes whiz through the day at fantastic rates of speed. Nothing seems to slow them down. How wonderful it is to have people who key 15,000

(Continued on Page 48)

Turning a profit in turnkey systems:

If your business is selling turnkey computer systems, using the right computer can be the key to making more sales—profitably.

You need a computer that's easy to use—and adaptable to many uses so you can get more customers. And you want a computer that's priced to sell, at a margin that's profitable.

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The BTI 4000 has been proven in all kinds of applications—general accounting, dealer inventory control, entertainment ticketing, text publishing, school administration, and more.

What's more, the BTI 4000 is proving its reliability at locations in 39 states, in 5 provinces of Canada, and in Europe, too.

Things you'll like

The BTI 4000 uses BASIC-X, an unusually powerful extension of BASIC. With the features you need to get your software up—quickly, efficiently. So you can start selling sooner.

Especially important to you, the BTI 4000 protects your proprietary software. So you can count on selling it again, and again. Without losing control of it. And with the convenience of dialup access, so you can support it without the cost of site visits.

Things your customers will like

The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, from any number of locations.

Your customers will enjoy faster response, because the BTI 4000 implements many of your application program operations in firmware.

The system also offers continuous availability, because software backups, updates, and other housekeeping activities can be performed locally, remotely or programmatically, with users on the system.

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'Ease of Use' Has Become Latest DP Buzzword

By Douglas J. Bartek
Special to CW

In the first 20 years or so of the computer industry, success among computer manufacturers was measured by superior price/performance of hardware and utilization of special operating system capabilities. However, in later years there has been a growing demand from the DP industry user community for systems that offer not only hardware efficiencies, but also better user conveniences and tools for maximizing the productivity of personnel. As long as hardware unit costs continue to drop and the cost of personnel continues to rise, this area — ease of use — will receive increasing attention.

The idea of stretching the DP dollar through easier-to-use systems is not new, of course. But because of the industry's past orientation to the DP professional and his use of the computer, some of the best ways of increasing productivity have been largely neglected. This includes expanding the use of the computer to the non-DP potential end user (businessman, executive or clerical personnel not trained in DP).

Industry efforts have been started in this area, particularly in the word processing and small business systems marketplaces. These efforts are expanding upwards into the larger mainframes as the value of easy-to-use systems and tools becomes more and more obvious.

'Different Strokes . . . '

This has created some semantic problems in the industry, as "ease of use" implies different things to the three different types of current and potential equipment users. "Ease of use" to an operator may imply a special function key on the system console. To an applications programmer it might imply a utility package to aid in debugging. To the non-DP end user it may mean simply asking the computer a question in the form of a natural English sentence and getting a natural answer in return.

Emphasis in the past has been placed on ease of use for systems personnel, perhaps since software developers are more familiar with their particular needs. Systems personnel are the operators, system engineers, systems programmers, librarians, etc. responsible for the maintenance and well-being of their system.

This group is concerned with optimizing resource utilization, developing scheduling procedures, the physical custody of the installation's data bases, the required security controls, new software release updates and other matters. Thus, ease of use for systems personnel is concerned with accessibility of system functions, diagnostic and monitoring capabilities, easy software release installation, minimizing operator intervention in handling of jobs and simple console interaction, among others.

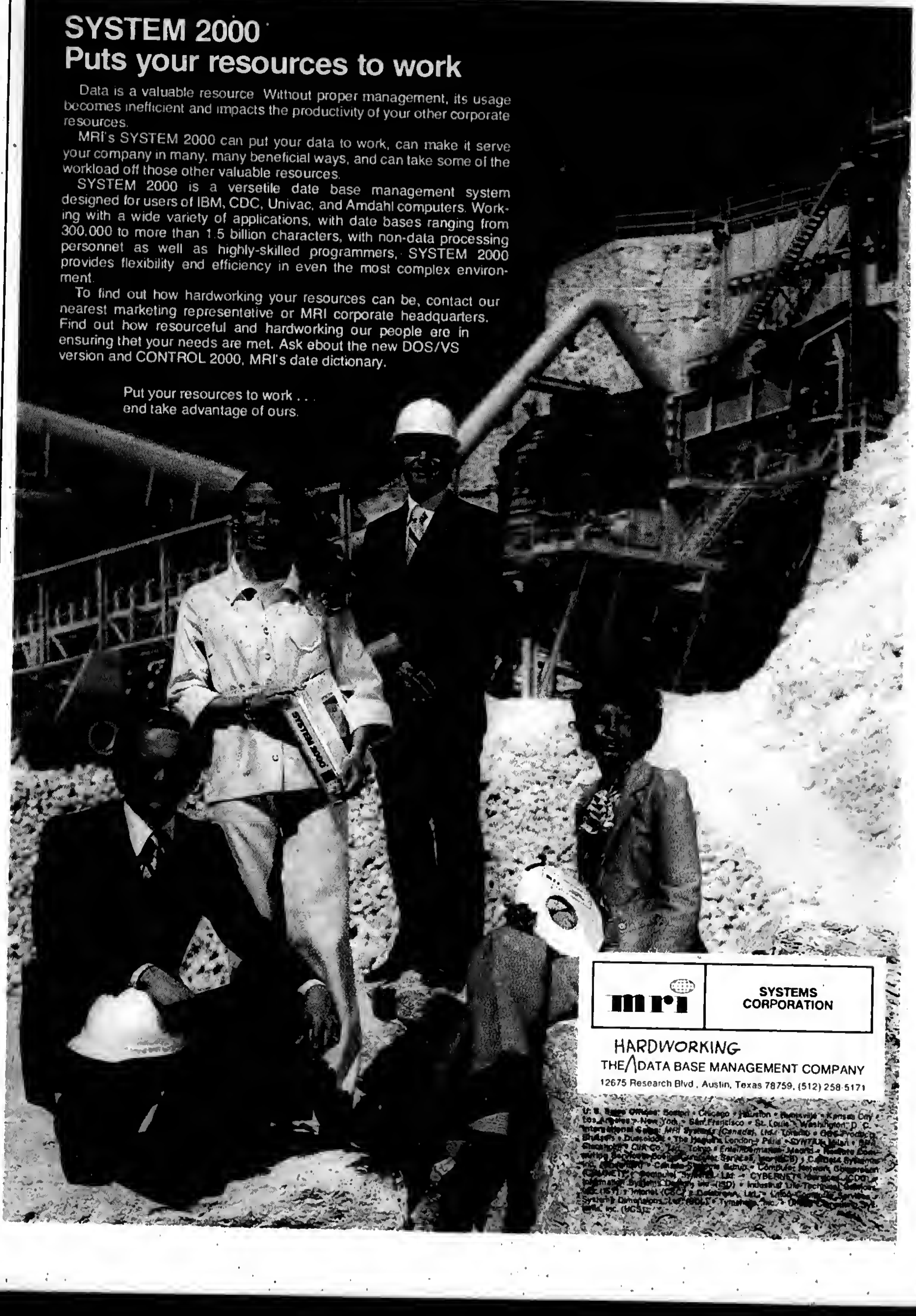
The application programmers analysts are those who interpret the end users' needs and develop the procedures and programs required to obtain solutions. Ease of use for application programmers/-analysts implies a DP facility which is available when needed and which provides quick and accurate feedback in understandable terms.

It also means to them a system which is consistent across all interfaces and a system in which they do not have to be concerned with particular methods the system uses to access data files and communicate with remote terminals. They should not have to be concerned with internal details of the system, specific resources used or the internal language of the system.

Ease of use for this class includes the facilities, capabilities and tools to improve programmer productivity, to allow them to be more responsive to user requests, to do their job with fewer and/or less-skilled personnel and to better utilize their production and development activities.

End users of DP systems include all those who use the system's output or results to perform their jobs. They may not be acquainted with DP technology and, in fact, probably care little about the details of DP systems. To them DP is simply one service among many they might em-

(Continued on Page 46)



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Bowe Burster

PLAINVIEW, N.Y. — Bowe Systems is offering a burster that can handle up to eight-ply forms and processes up to 550 ft/min, according to a spokesman.

The Model 321 features programmable command cards in the form of printed circuit boards with electronic controls and electronically assisted servo mechanisms

—Unit speed can be user-regulated, he added.

Center cutting and margin trimming can be accomplished with two margin trimmers and a longitudinal center cutter that are standard equipment, the spokesman said.

The Model 321 costs $10,900 from Bowe at 175 Express St., Plainview, N.Y. 11803.

'Ease of Use' Latest DP Buzzword

(Continued from Page 43)

ploy to solve their problems or to perform their work. Whether they employ it depends on how easy it is to use and on its accuracy, timeliness and cost.

Thus, ease of use to the end user centers around the user interface itself. The user must be able to interact with the interface in the user's "source" language; i.e., a businessman or secretary should be able to retrieve a "report," not a file under a certain catalog in the file system, and be able to make changes to it using simple commands or physical actions without worrying about temporary scratch files and buffer storage.

The end user also needs a simple, consistent command interface to allow him to state the developed solutions in terms that are meaningful to his area of expertise, without requiring him to learn the idiosyncrasies of the DP system. Furthermore, the end user needs user-oriented, easily understood documentation that describes the system's external behavior without describing the internals.

End Users Organize

The growing end-user orientation may, in fact, be the prime vehicle for stretching the DP dollar and system productivity in the near future. End-user organizations are becoming more actively and directly involved with access to their data and manipulating it for their needs. These organizations need facilities and capabilities to get responsive results and are pressuring their DP organizations to acquire the needed capabilities for them.

In a recent ABC Management Systems survey concerning non-DP end-user capabilities, 93% of the DP professionals in most companies have selected a variety of reporting, retrieval, file and data base management systems, making programming easier, faster and cheaper for programmers, analysts and systems personnel. But fewer than one in 10 non-DP end users — the businessman — is prepared to learn how to fill in some coded forms or to learn some simplified kind of programming. These are too complex for the remaining nine out of 10 businessmen.

Further evidence of this lack of end-user orientation to date are the findings of the End User Facilities Task Group, now a full-standing committee of Codasyl, which stated in a recent report: "The current interfaces claim to be designed for the non-DP-trained end users, but, in fact, they are similar to computer programming languages, without any effort to establish that such interfaces are the best and that they are truly effective."

Increased Emphasis

Undoubtedly, the future will see increased emphasis placed on the non-DP end user as a means of stretching the DP dollar. Just as the past has seen advances made first for systems personnel (for example, assembly language coding over machine language), and then for application programmers/analysts (higher level languages and operating system utilities) as a means of increasing productivity, the end user should begin to see major improvements in the future. Th driving forces of economics are present, intensified by a movement toward distributed systems, which will ensure that the computer becomes more accessible to the non-DP-professional end user.

We will begin to see, among other advances, natural English language (not just 'English-like") query systems attached to data base systems in order to simplify the extraction of data. We will see greater use made of special functions keys on terminals to perform a series of tasks specific to the individual user's environment.

In general, ease of use will be not only a methodology to apply in simplifying the work to be done by a computer, but it will come to be an attitude and philosophy in all areas and stages of development as manufacturers and users alike strive to increase the productivity and usage of DP systems.

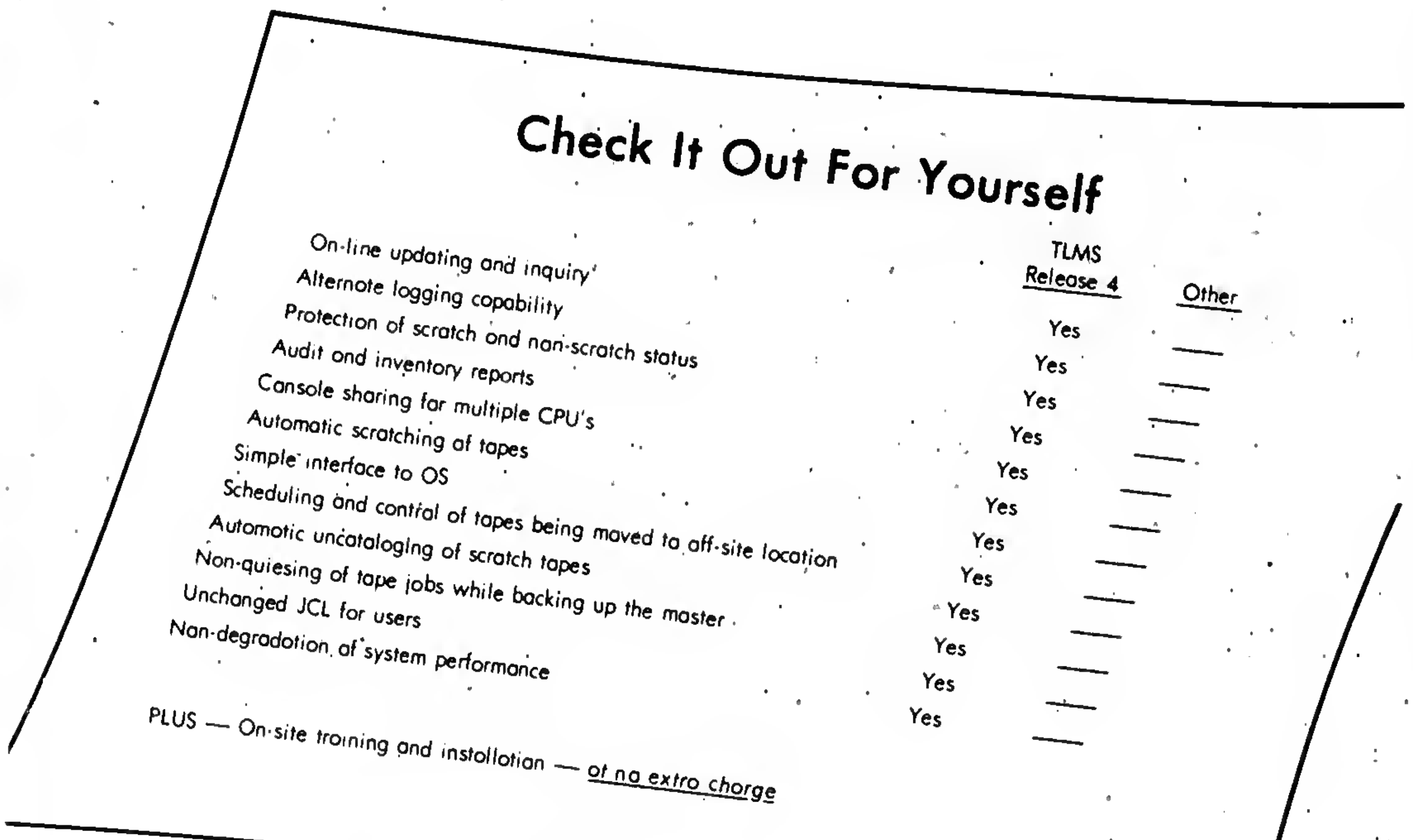
Bartek is the manager for interactive systems planning for Honeywell Information Systems in Minneapolis, Minn.

Line Conditioners Out

SAN DIEGO — Power-Matic, Inc. has introduced a family of alternating current line conditioners.

Eight standard models are available with symmetric or skewed input ranges for wide-range, brownout and overvoltage conditions.

The units range in price from $445 to $505. Additional information is available from the firm at 8076 Engineer Road, San Diego, Calif. 92111.



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For accurate, timely management information, LDCS records vital data (caller-identification, number called, duration, cost and others) for each call and issues printed reports in a number of useful formats. Management receives a complete accounting of telephone costs at all levels in the corporation and can accurately "bill back" each department on the basis of use, even for flat rate services. The result is shorter, more efficient business calls, reduction of personal and non-business calls and more efficient use of telephone facilities.

LDCS is a modular and turnkey system requiring no user programming. LDCS can be configured to cut telephone costs for companies spending from $5,000 to $150,000 per month on long distance charges.

SMDR–
For Local Call Management

Telephone companies around the country are introducing a new pricing that can heavily impact telephone costs. It's called "Usage Sensitive Pricing". This pay-as-you-go message unit billing approach now affects about 40% of the Bell System's 9.3 million business customers. Already New York, Chicago, Los Angeles and other metropolitan areas are billed by message units with more cities due for this approach soon.

What this means to the businessman with heavy metro or local calling traffic is that the short distance telephone charges may soon start to rival the long distance charges. In fact, many companies are now spending $5,000, $10,000 and even more each month on local tolls.

The INFOSWITCH/SMDR (Station Message Detail Recorder) can let the businessman begin controlling this cost. In operation, the SMDR automatically records and stores the caller extension number, duration of call and number dialed of each local or metro area call.

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For many companies incoming telephone calls represent a primary and most critical contact with a customer or prospect. Whether received via local facilities or via long distance service, these calls must be handled efficiently. A company's image often depends on telephone response and agent handling.

Companies which depend on the incoming telephone call for basic business contact range from corporate giants, such as international airlines, down to relatively small firms such as direct mail catalog sales companies. Typically, calls are received on a variety of facilities such as local lines, IN-WATS, FX, TIE, and other services. Each of these calls is answered by an agent on key-set instruments.

In a typical call processing center, it's very difficult for the agent to provide fair and equitable service to incoming calls, and customer frustration can mount quickly. With currently used instruments it's impossible to distribute calls efficiently and fairly to an agent force, and very difficult for the agent to determine which call has waited the longest for service.

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Independent Memory Can Liberate Budgets

(Continued from Page 41)

ing costs are proportional, the energy savings are over $230/mo.

Further, some independently supplied add-on memory modules may be used as duplex memory. The common approach to configuring major teleprocessing or multiprocessing systems in which uptime is crucial, is to acquire redundant "twin" systems. If something goes wrong with one, the other provides backup. But the equipment cost is doubled. Some independent memories include sophisticated switching features that enable operators to dial out sectors of failed memory, while remaining memory continues to perform its full function. By utilizing an add-on memory of this type, the user can gain the reliability advantages of having two separate CPUs without the high cost of complete processor and memory duplication.

Minis Go Independent

Increasingly, cost-conscious computer users are turning to less expensive minicomputers to trim their DP budgets in specialized applications and "small shops." Here, too, it makes sense to stretch your equipment dollar by shopping both price and performance.

Many of the cost savings discussed here can be achieved through careful selection of non-storage devices, such as terminals, sophisticated communications processors and even complete CPUs. However, one must keep two major considerations in mind.

First, what impact will implementation of any equipment have on daily operations? Will time-consuming and expensive software modifications or conversions be required for successful implementation? Often, the piecemeal device approach to improving performance doesn't really solve the overall problem. Main memory is the only plug-compatible product that is truly software transparent, and that gives users what they need — more available computer power.

Second, how reliable is the vendor? Is his product backed by experience, support and service that are widely recognized and respected in the industry?

The thoughtful user can stretch his DP dollar only by examining all of his equipment alternatives thoroughly and independently. No single solution is appropriate to every problem, and the high cost of good performance doesn't have to be commonplace.

Egan is executive vice-president of Cambridge Memories, Inc.

Data Entry Costs Hinge on People

(Continued from Page 42)

keystrokes per hour day after day. Too bad they hardly ever show up for work. If you could only find some way to improve their attitude about working.

High degrees of aptitude and experience are worthless if you can't get people to show up for month-end closings. Slow, reliable people who can key without many errors are nice peole to have around when you need them. Remember, you can't change attitudes. We are what we are and not much is going to change us. However, if you can find people with good attitudes and aptitudes combined, you've got some winners.

• Incentive — Have you ever heard the comment, "Why should we pay these people an added incentive? They're getting a weekly paycheck; that's enough incentive." Sound familiar?

If you wonder why data entry operators need more incentives, try sitting in an upright position on a hard chair for seven hours, while trying to read some scribbled handwriting, meanwhile straining your eyes to keep pace with an unrelenting minicomputer feeding you requests for more and more data. It's tough work.

It's not like secretarial work for which you can set a personal pace. It's a throwback to the start of the industrial revolution when people were forced to keep pace with steam driven machines. Obviously they get accustomed to the pace, but people today want something more than just a promise of being able to keep their jobs.

Many operators will work more productively when their output is tied to a cash incentive. They can relate to that. For them an incentive bonus is something that makes work bearable.

• Training — Improved training may be the most overlooked technique for increasing productivity. It is the most controllable method in the hands of the supervisor. Training increases skills and productivity. People can be trained to increase their ability to scan and intepret source documents, make better use of the keying procedures and improve their concentration. Training builds skills and morale.

• Environment — Unfortunately for some operators and managers, data entry is still "down in the basement." The department was a nice place to work in 1910 and it hasn't changed a bit since. Too many companies place their operators in an environment which says, "Here is what we think of you and your department."

One of the simplest and fastest methods for increasing productivity is to provide a more productive environment. Simple changes in room layout, better chairs and improving lighting can produce remarkable results.

The fastest method for stretching today's data entry dollar is to consider the above techniques for making data entry operators more happy and productive.

Henderson is editor and publisher of Data Entry Digest, *10522 Ridgeway Drive, Santa Ana, Calif.*

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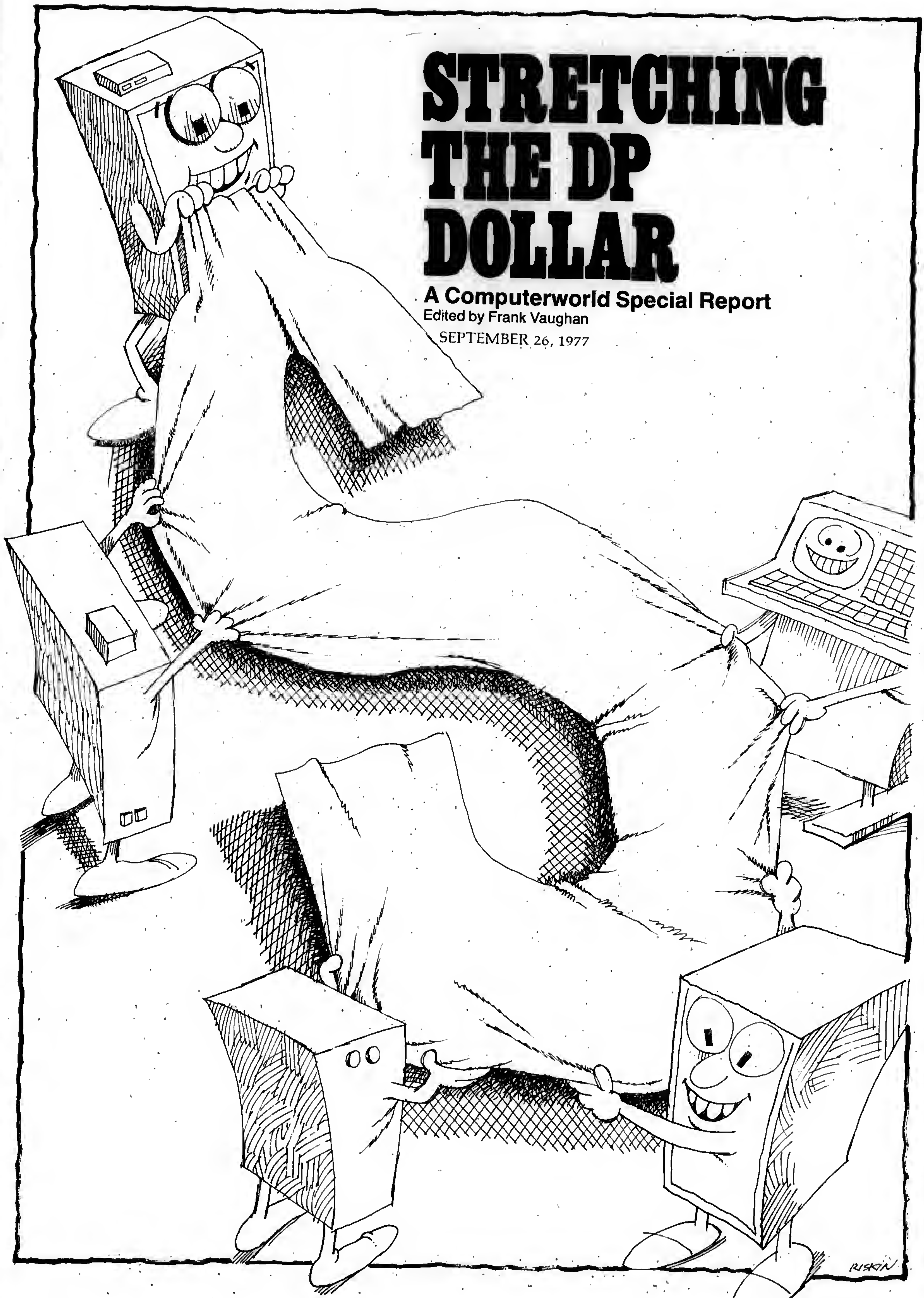
STRETCHING THE DP DOLLAR

A Computerworld Special Report

Edited by Frank Vaughan

SEPTEMBER 26, 1977



In Choosing Magnetic Media

Key Factors in Storage Choice? Access and Cost

By Phillip Ricketts
Special to CW

The correct choice of magnetic recording media for both on-line and off-line data storage applications can save money by improving system performance. The time a program waits for data to appear in main memory is, in part, the visible impact of the media on the system's throughput.

To determine which magnetic media, (magnetic tape, disk packs, floppy disks, cassette/cartridge or some combination of these) the following questions should be asked. How is the storage media going to be used? How fast do you need access to the data? What type of media is the present system compatible with? What are the trade-offs between faster data access and lower storage costs? Finally, are the data storage needs large or small?

When storage requirements are large, magnetic tape generally competes with disk packs. Similarly, when storage requirements are small, floppy disks compete with cassette/cartridges. Therefore, these two categories will be discussed separately.

Large Storage Requirements

Unquestionably, the most popular media for storing large quantities of data off-line is magnetic tape. Comparing tape with disk packs, for example, we can see in Figure 1 that significant cost savings can be realized by using tape in certain applications. Mass production techniques have reduced the cost of this media and large amounts of data can be stored on it relatively inexpensively. Another plus is data interchange. A reel of tape can be easily moved from one system to another. Also, tape provides low-cost data backup.

On the negative side, tape has the basic limitations of slow access time because processing of tape files is done sequentially.

To alleviate the problems of on-line data availability inherent in magnetic tape, disk media is generally used. Fast access rates and high transfer speeds are two major reasons for using disk media. When using disk storage, the data is accessed and transferred in milliseconds rather than seconds or minutes as with tape. Not only is system performance improved, but communications costs are also reduced.

Main Trade-Offs

The main trade-offs, then, between magnetic tape and disk packs are cost/access and cost/bit stored.

Disk media has the superior cost/-access (Figure 2). For example, to locate a random record on a full reel of tape would take an average 72 seconds assuming a 200 in./sec search speed. The time to locate the same record on a full 200M-byte disk pack is only 30 msec, since access time is independent of the location of the record. This high speed is particularly significant if the DP system operates in an interactive or telecommunications environment.

Therefore, disk media is preferred for applications that require an immediate response, as the incoming data enters the system in a random manner. To make use of the rapid response capability of disk, very active data sets are usually put on disk. At one large installation, all data sets that accessed 10 times or more per day and are less than 300K bytes in size are put on disks.

Tape media has a lower cost/bit stored than disk media. A typical reel of tape costs about $12, whereas a disk pack of equal capacity costs about $500. Therefore, tape is the preferred media when each rcord in the file needs to be read and worked on sequentially. Another plus is that magnetic tape offers the least expensive means of storing data off-line and backing up on-line critical files.

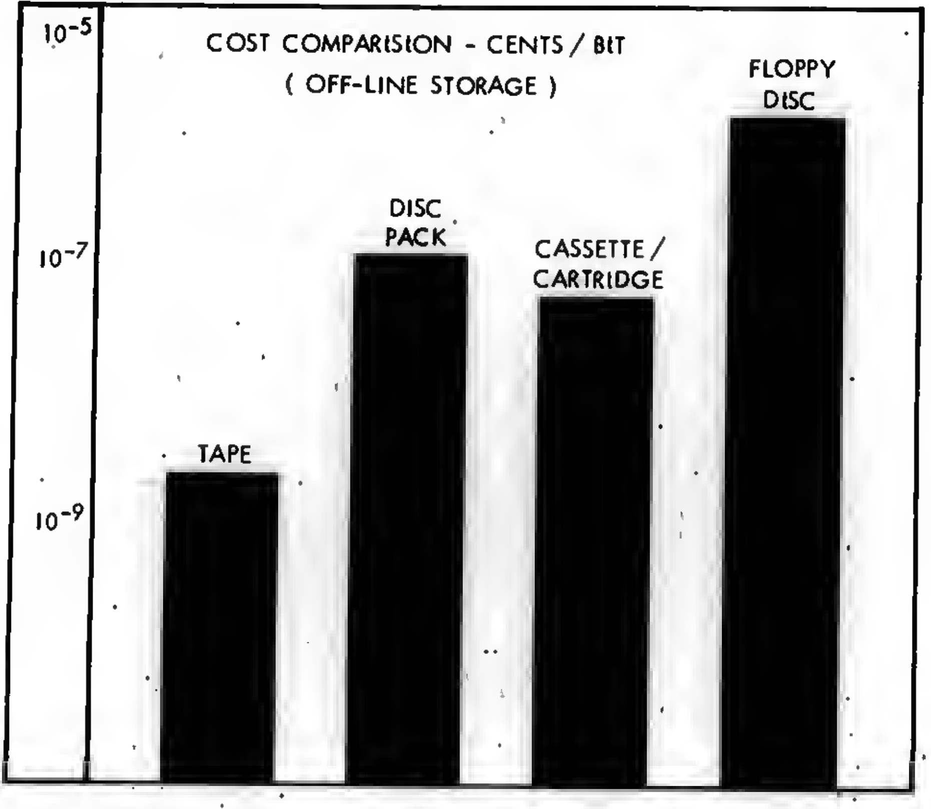


Figure 1

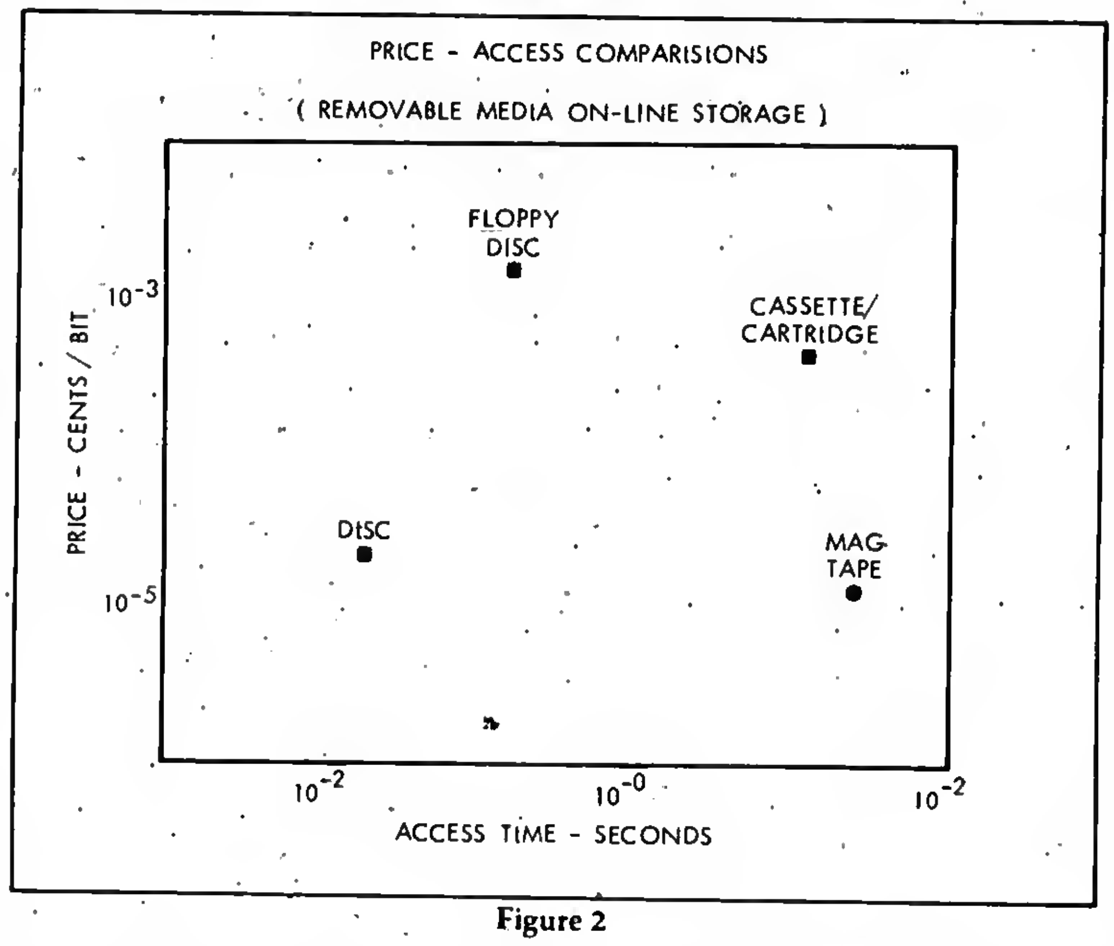


Figure 2

Small Storage Requirements

The tape and disk systems used with large computers are incompatible with small minicomputers requiring a small amount of storage. These large storage media systems can cost more than the minicomputer itself and have much more storage capacity than required by small minis.

For applications that require small data storage, cassette/cartridge and floppies are the favored media. The floppy disk is essentially the same media as tape, but it has the form of a disk and is similar to a 45 rpm record in appearance.

The greatest appeal of the floppy disk as compared with cassette/-cartridges is its quick access time (Figure 2) — one to two orders of magnitude faster than cassettes/-cartridges. A disadvantage of the floppy disk is its cost/bit for off-line storage. Floppy media can cost two to three times as much as cassette/-cartridge media for the equivalent amount of storage capacity.

Best Choice

Except where random access is needed, cassettes/cartridges are the best choice. This type of media, due to its small size, convenience and low cost is an ideal media for many small storage applications such as data collection. The advantage of the cassette/cartridge media is that it can be stored more easily and inexpensively (Figure 1). Also, in most cases, more data can be stored on a cassette.

Therefore, for small storage requirements, cassette/cartridge media has the edge for cost and storage capacity while floppies have superior access time. If the application calls for low cost and small size, cassettes/-cartridges are the answer. If fast access is needed, floppy disk media is the best choice.

Whether storage requirements are large or small the key criteria for determining the best media choice is the trade-off for a given application between faster access and lower storage cost.

Ricketts is disk packs products planning manager for Memorex Corp.

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DP Center Heeds Hardware, People Comforts

By Frank Vaughan
CW Staff

NEWARK, N.J. — Companies can and frequently do make costly mistakes when putting up an office complex that has a DP center within its confines. The simple considerations such as where to put the computer cell are not so simple at all. In fact, location should be high on the checklist of major concerns, according to Harry Mahler.

Mahler is a partner in the Grad Partnership, a firm that has designed several hundred DP centers. He underscores the location of the computer cell as perhaps the most important consideration because it affects so many other factors: security, access to appropriate staff members, materials handling, operational efficiency and energy. The well-designed center can actually reduce operational DP costs, he said.

Ideally, the computer cell should be located as centrally as possible within the building, he said. The reason for the central location is that the insulation of computer cells is caused by the density of wall construction and air masses created by the rooms, thus stabilizing the internal environment. This stabilization of internal temperature and humidity is a desirable design goal that can save operating costs if successfully implemented.

Conversely, Mahler discourages utilizing space on an outside wall for reasons of security and because of vulnerability to environmental conditions and changes.

There can be exceptions to the "no outside wall" policy if walls of extra mass are used or if the earth is moved up against the side of the building to create a below ground effect for the computer cell. In both of these cases, the DP center is insulated from the elements and possible security breaches.

Bury the Pride

Companies should no longer pride themselves in showing off their computer systems with a fishbowl-type setup. The ideal location of the cell would provide adequate access to authorized persons and limited access to nonauthorized persons. The location, therefore, has a lot to do with the total security system.

With the large volume of paperwork traffic that accompanies a DP operation, the center should have direct proximity to the materials handling systems. A separate storage facility, with an environment consistent with the DP center, should adjoin the computer cell, Mahler recommended.

The size of the center would be dictated by the number of modules and the amount of hardware, he added.

People Work Here, Too

Many companies are becoming people conscious when planning their facility and this poses the problem of how to provide a pleasant working environment in an essentially windowless center that operates 24 hours a day under stringent security conditions, Howard Horii, another Grad partner, observed.

His solution is to provide a separate lounge as a definite part of the DP center.

There are also some safety standards that Horii indicated must be considered too:

- Fire Protection — The best method is a Halon system which is triggered automatically by a heat or smoke sensing detector and smothers the combustion with an invisible gas.

(Continued on Page S/4)

When Upgrade Seems Inevitable

Common Sense Can Save Some Cents

By Don Leavitt
CW Staff

Stretching the hardware dollar must have its start with a good choice of hardware and the best contractual arrangement available at the time. That's true enough.

The stretching can continue, often very effectively, through the use of hardware and software monitors, program code optimizers and other tuning tools, especially if the programmers learn the lessons put before them by the optimizers so that their code becomes more effective and efficient, even without the extra loop of "tuning" it before it goes operational.

There have been numerous instances, by now well documented, showing that monitoring what parts of the system are being used, or alternatively underused, has led to better balanced and often heavier workloads on the existing equipment. It has also led to the return of whole subsystems of peripherals, for example, so that the current work ends up being done very effectively on a smaller, less expensive system.

Certainly a number of installations have gone the route of assessing just what they had on their computers and what value, if any, it had for the organization's purposes. By offloading applications that no longer warrant the use of computer resources — if they ever did — and by sharpening how the remaining programs operate, these users have held the line stretching the life of what had seemed saturated hardware.

Each of these approaches clearly should be part of prudent management. There's little you can logically fault in any one of these ideas. But the fact is that even after they've all been tried and used to their fullest, tuning and monitoring and "do we really need that?" just can't get any more capacity out of a system.

Then is the time when an upgrade, or another CPU, or more memory or something is justified, right? Maybe, but then again, maybe not. There is a story that has gone the rounds of some DP circles — it happens to be true: I know at least one of the people involved — that shows how well just plain common sense can fit into the picture when all else fails.

In this instance, the installation was a large one by almost any measure. It had a pair of IBM 370/168s, or something in that same range, and was supporting a substantial national and/or international data communications network.

But the support was fading and supervisors were getting worried. Turnaround time, which had been at some quite comfortable level, had reached five and a half hours and that was not acceptable to this user com-

(Continued on Page S/11)

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And Promote Wise Spending

DP Audit Can Unearth Inefficient Practices

By Richard W. Lott
Special to CW

An audit of the computer operations may be used to increase the economic value of DP. It is well documented that the top management of organizations has not paid proper attention to DP operations and this lack of attention provides room for such practices as incompetence, empire building and covering for others. If there is no incentive or reason for DP operations to spend wisely, then they may not.

Following are four true examples of inefficient practices that were detected by DP audits. In one company, a four-hour computer run was interrupted by the company president who required that a special report be run immediately. The special report was run and the original job was restarted from the beginning. The DP personnel had never heard of the use of checkpoints to permit a restart at the point of the interruption.

Second Case

In a second case, a company never made a serious study of the economics and practicality of having a service center process its payroll. With a brief statement that "it wouldn't be respectable to hire outsiders to do payroll when we have our own computer," the company just went ahead doing the payroll itself and thus failed to computerize some "bread and butter" applications that would have had a significant impact on profits.

A third situation involved a company that had leased keypunch machines for 18 years. The justification for doing so was the reported ability to replace the machines quickly if new models were developed. The real reason for leasing so long was that the firm had cumbersome procedures for buying capital equipment. The manager was just taking the easy way out with no regard to the financial impact on his employer.

Another example involved a company that had a rerun rate of about 15%. The rerun situation had been with the firm at that level for so long it was a way of life — almost a joke. An auditor made a careful analysis of the rerun situation and determined that much of it was due to poor preparation of source data.

Unfortunately, most of the company's control procedures started at the point where the raw data entered the computer center (essentially at the keypunching stage). Manual procedures had never been considered a part of DP operations, and since the internal customers were being charged for all the DP costs without much caring about them, DP had never bothered to solve the problem.

Two Obvious Problems

Once top management recognizes its exposures due to a possible mishandling of DP operations, it is in a position to determine whether to invest in DP audits. Two obvious problems are whether an audit will be worthwhile and finding a competent auditor. Perhaps there will have to be an actual trial run to see if some problems will turn up; certainly management should be able to develop a list of several application areas that have potential.

An effective DP auditor is one who has both the inquiring mind of an auditor and much of the skill of a DP specialist. Perhaps it is best to hire this person on an *ad hoc* basis until it is certain that a full-time effort can be justified.

The final point is that management should not assume the DP side of the house is performing efficiently. The use of a DP audit is one method by which management can help assure itself that the organization is getting a fair shake.

Lott is a faculty member at Bentley College, Waltham, Mass.

Ideal DP Center Heeds Hardware, People Comforts

(Continued from Page S/3)

- Interior Security — Corridors used by employees during nighttime or off hours to get to the DP center must be well-lighted and security controlled.
- Parking — Again, because of the sometimes 24-hour operation of DP facilities, nighttime parking can be a hazard. Safe and well-lighted parking areas should be designated for DP personnel as close to the building as possible.

Other possibilities for improved efficiency as well as comfort are proper lighting, heating and cooling and carpeting, Horii said.

The ideal light fixture creates no glare, Mahler said. He compared the desired effect with the lighting people enjoy while sitting under a tree on a sunny day. The trick is to lower wattage per square foot, thus reducing energy consumption, while maintaining the proper quality of light.

When looking at heating and cooling, it is important to note that it is more efficient for the equipment to blow air through the flooring than from overhead, Mahler pointed out. This way, cool air can be delivered to the equipment and occupational areas first before reaching the full height of the human comfort zone.

In one project Grad designed with consulting engineers Jaros, Baum & Bolles for New York Life, they were able to devise a heat recovery system which used the heat generated by the mainframes, various mechanical systems, lights and body heat of the employees to heat the entire 400,000-square foot building. In fact, the boilers did not have to be turned on even in this past deep-freeze winter, he claimed.

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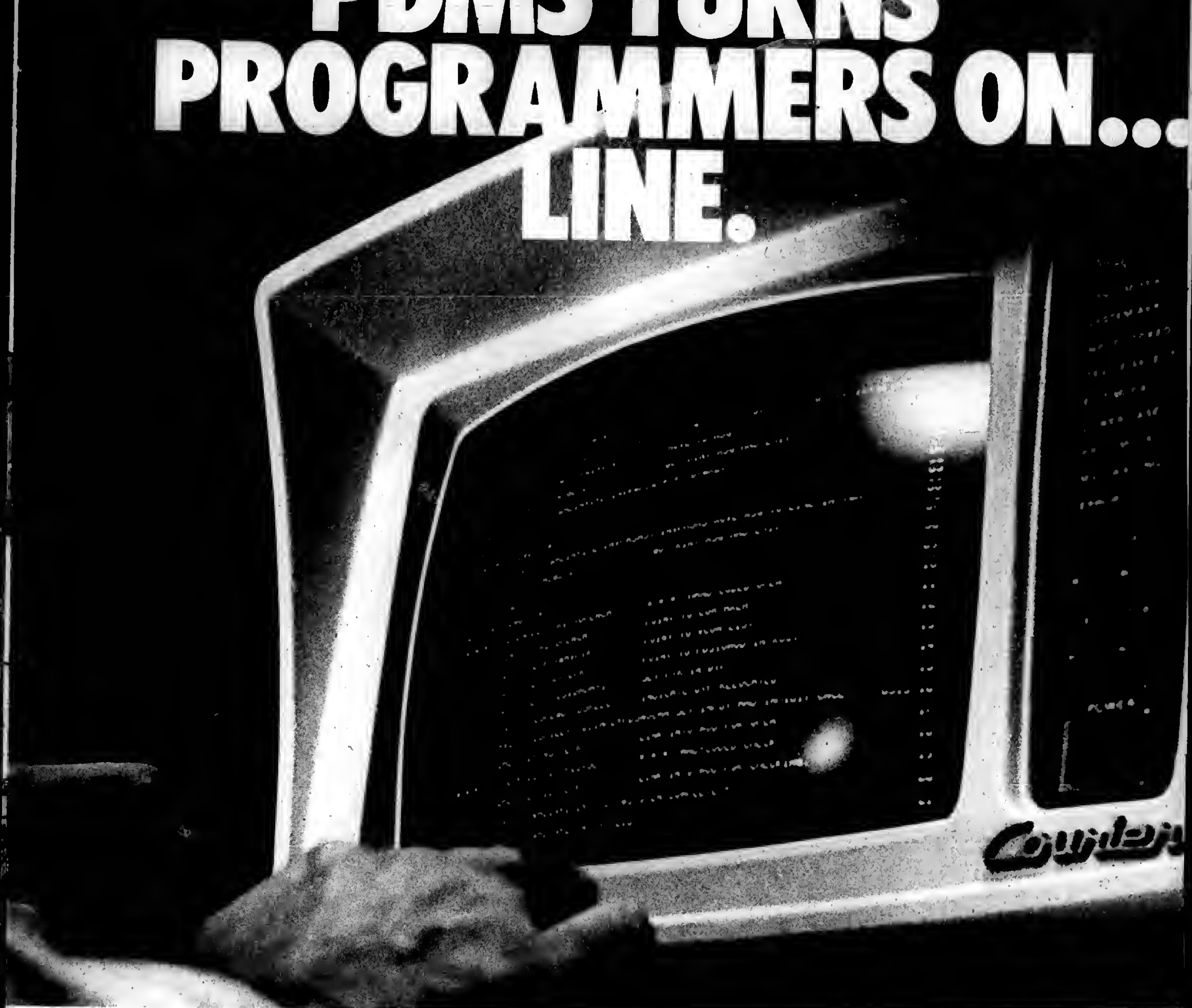

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Take Shortcuts on Software Purchase Road

By Donald R. Landgraf
Special to CW

Reaching a final decision on buying software is not fun, as people who have been on the "magical technical tour" well know. Many times, even the final results aren't fun either.

It is agonizing to spend great amounts of time to end up with a software package that doesn't exactly meet the specifications of the job at hand. It is many times more agonizing to try to write a system that is perfect, however, and that is why the software was purchased to begin with and why the shortcomings are tolerated.

In recent years, a common methodology has developed for the evaluation and acquisition of proprietary software: identify your need, scour the directories for possible solutions, write vendors for literature on products, schedule presentations with those with the most promising literature, evaluate the products in the final running and make a final purchase decision.

This whole process is a narrowing-down escapade with the ultimate purpose of finding the best package to meet a need. The trick of making the search as fruitful as possible is to make the search as short (inexpensive) as possible, but without sacrificing confidence that the end product is the best available.

There are some shortcuts and information gathering techniques that you can use to shorten that software acquisition cycle with greater confidence that your final choice is the right one. You still have to identify your need and survey the catalogs for the choices available. These suggestions are intended to shorten the narrowing-down process.

'Knockout Factors'

The first shortcut comes into play shortly after you have identified your need for a specific software solution. It is called "knockout factors," a list kept in mind all through the evaluation process.

William R. Synott, senior vice-president of the First National Bank of Boston, said in his address to the American Bankers Assocation conference in New Orleans, "These are your most important criteria for reducing the number of possibilities you will investigate." Such factors, as outlined by Synott, are the obvious ones of upper cost limit, modifications necessary to make the package run on your machine, amount of core required, payment plans available (if you can't afford large sums of money at once, lease is essential for acquisition), cost of on-site evaluation, hardware/-language restrictions, etc.

Two additional areas of knockout factors should be explored early in the acquisition cycle. The first is the company behind the product. The second is product applicability.

When one is shopping for a home, it is advisable to always look at the basement first before being excited by the wallpaper or the size of the master bedroom. The foundation is what holds the whole thing up.

Software purchasing is no different. The company behind the product is the system's foundation, it should be explored thoroughly.

You are ostensibly purchasing software for a long-term benefit. You are paying a good deal of money for the software to keep up with hardware technology and computing advancements. You want to make sure that is the intention of the company behind the products.

If a company is profitable and successful, that is the degree of proof of market acceptance and stability. These are questions you should ask:

- What is the sales and profitability history of the company?
- What is the Dun & Bradstreet credit rating of the company?
- How old is the company?
- What user organizations exist for the products?
- How widespread is the serviceability? Local? National? Worldwide?
- How many products does the company sell? How many are on the Datapro Honor Roll of Software?

Assuming the company behind the product looks sound enough to grow with your DP needs, it's time to ask some pointed questions about the product itself. Try these for starters:

- What is the product's enhancement record? This will tell you just how well the product is keeping up with technology.
- Is there a maintenance fee for this product and, if so, what do you get for maintenance? There should be a healthy list of services supported by maintenance dollars "support" as an answer is not enough.
- What kind of technical support is there? Telephone only? Is there a periodic problem reporting system?
- How good is documentation and how often is it revised? Documentation is never perfect, but vendors who strive to approach perfection have your best interests at heart.
- What kind of training do you get with this product? In general, the more comprehensive a system is, the more training is required. One should expect on-site or personal training of key personnel upon installation with possible follow-up training included as part of the purchase contract. The better the training, the more use the product will get and, thus, the more benefit it will be to your organization.
- How many installations are there of this product. You'll find that the more

(Continued on Page S/14)

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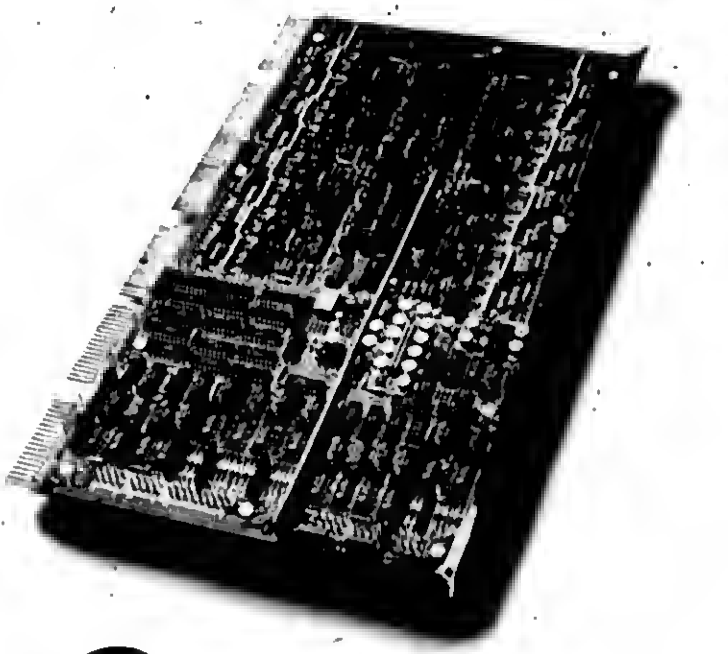

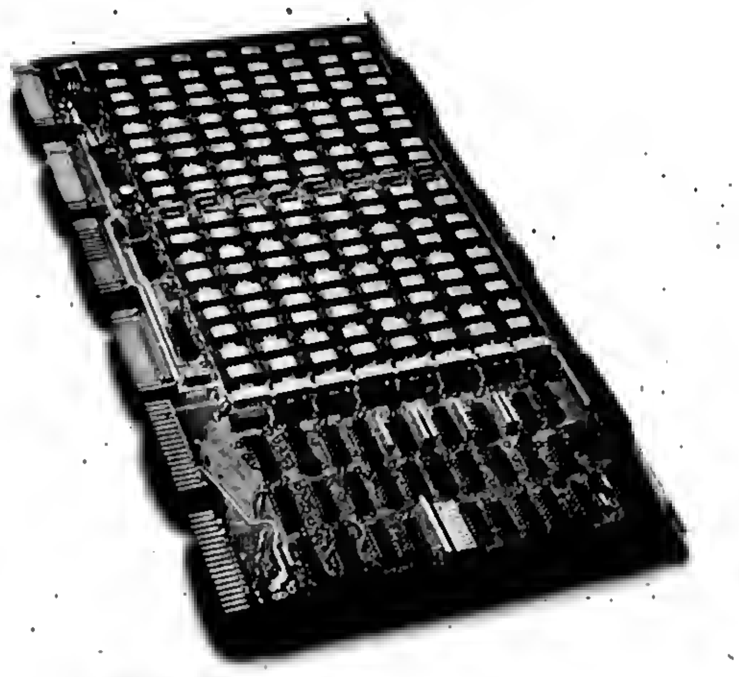

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Help Keep Costs Down

Student Staff, Mixed Vendors Aid College Site

By R. Waldo Roth
Special to CW

UPLAND, Ind. — Taylor University here has used a variety of methods to keep the cost of its instructional administrative computing center down during the 10 years the center has been operating. These methods have included mixed vendor hardware, in-house software and maintenance, student staffing and several do-it-yourself projects.

When the university's original Digital Equipment Corp. PDP-11/40 time-sharing system was purchased five years ago, it was a total DEC system with the exception of the Teletype Corp. Model 33 ASR terminals which had been obtained from a second source, Com-Data in Chicago. As time went on and the management of the center became more sophisticated and experienced, additional needs were met by evaluating alternate sources for each new hardware item. These purchases included CRTs, large-capacity disk drives, add-on memory from two separate vendors [CW, July 18] and printing terminals.

An additional way in which hardware acquisition costs have been minimized is that peripherals already in use on the school's earlier General Automation Corp. 18/30 batch system have been adapted to the DEC time-sharing system by obtaining either controllers or interfaces existing on the market for these purposes.

The first experiment of this type was to purchase an asynchronous data line from GA so that the system could be accessed by the DEC time-sharing system. In time, an in-house modification permitted the printer to be accessed from either computer system by changing a switch.

This success led to the purchase of other interfaces: An MDB Systems interface that allows the Wang Co. tape drive originally purchased with the GA system to become a permanent part of the time-sharing system.

It should be pointed out that these modifications have not all been made simply and easily, but with good in-house know-how and some vendor support they have all been successfully completed. Taylor is still looking for and pricing interfaces for its Calcomp 565 plotter so that it too can be attached to the time-sharing system.

Software Operations

Although most of the Taylor software to date has been written in-house, the purchase of a data base package from Educomp was helpful in bringing some administrative applications up on the time-sharing system. This package has been greatly enhanced and upgraded by the staff in the center.

Most instructional software has been obtained for reproduction costs or slightly more from educational software houses and other colleges and universities. However, certain instructional packages have been written by faculty and students in-house, including a package for drill and practice in music intervals and chords written this summer by two faculty members — one in music and one in computer science.

The original time-sharing system was on a maintenance contract for the first two years with DEC. However, it was then decided that one physics faculty member — given some release time from other duties — plus the computer center director, John Kastelein — formerly an electrical contractor in the Houston area for three years — could maintain most of the system. DEC has continued to be available on a time and materials basis and has been most cooperative.

The system has now grown to a point that the center is considering other possibilities for maintenance — hiring of a maintenance person, sharing a maintenance person with one or more other installations or contracting with a multiple vendor maintenance house.

Student Staffing

Students have been successfully employed in the center since its 1967 beginning. They have been utilized in a variety of capacities such as data entry operations, software development (administrative, instructional and auxiliary enterprises) and instructional support. Although effective in most areas, they have been of the greatest assistance in converting administrative software (during the summer) and providing excellent laboratory support for students using the center and learning about computing.

During these 10 years, the student assistants have been available for over 40 hours per week during evenings and Saturdays. They have also assisted in teaching a noncredit course for high school students.

Another way of utilizing students in a learning environment, but not yet put into effect, is the concept of "contract programming." Students would read a set of program specifications prepared by the center and submit bids based on the number of hours they would estimate it would take to do the job. The low or best bidder would be contracted for the software. If the student's bid was significantly off in either direction, the contract

(Continued on Page S/11)

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Common Sense Goes Long Way to Save Cents

(Continued from Page S/3)

munity or to the DP management.

The computer work had long since been reviewed and found vital to the organization. It had been tuned and optimized till it just couldn't be handled any more efficiently.

To all appearances, the CPUs were saturated and the only solution left was to get another mainframe. The cost/justification was all worked out, passed up to the management committee and, depending on which version of the story you hear, the people from on high perhaps reluctantly agreed to seek a third 168.

But there was one last lonely staffer who still wasn't convinced. He had done some good performance analyses in the past, so when he asked for one more chance to "check something" before the requests for proposals were sent out, management gave its okay.

The analyst just couldn't accept the idea that a five and a half hour turnaround was caused by saturated CPUs. So he started timing how long jobs actually were in the computer, from entry to completion.

The actual numbers have been lost in the tellings of this tale, but they were in the range of five minutes or 5% of the total time. Small enough, in any case, so they seemed to confirm his suspicious that the CPUs weren't the bad guys.

Well, he couldn't let things go like that. Even if he was sure the CPUs weren't at fault, the installation still had bad turnaround time and there had to be a reason for that. He'd better find the real cause of the problem if he really wanted to head off the acquisition of another 168.

So he started timing all the steps in the cycle from the time the user submitted the request or the work to the time the desired output was returned. Everything was stop-watched; from pickup and delivery times, to data preparation, to computer room time, to time for printing, then collating, bursting, checking output and addressing it to the right party.

Without belaboring the story too much longer, he found that just about every phase of the system was working within reasonable limits — except for one. Output preparation — the printing, bursting, etc. — consumed something like 25% to 30% of the total turnaround time.

It wasn't that the people at that station were loafing or weren't dedicated to their work. They were typically working about as hard as any one else on the data center staff, and often a lot harder than those with more deskbound jobs.

The printers were producing the output fast enough: it was always stacked up higher than any of the workers liked to see it. But they had only one (or two or some too small number) decollators and bursters. That and not the "saturated" CPUs was the bottleneck.

The analyst recommended getting adequate paper handling equipment and the staff to man it properly and forgetting about a new 168.

Unfortunately, a simple solution might be great for the organization, but it can be embarrassing to those who had earlier proposed a grander answer. Obviously, the acquisition of bursters rather than another CPU was a constant reminder to the analyst's managers if not to himself that he was possibly more competent than they.

The atmosphere grew steadily more awkward and ultimately the analyst departed the scene.

Vendor Mixture Helps Cut Costs

(Continued from Page S/10)

could be negotiated.

Of course, this student assistance is not of benefit only to the college. The experience gained by students — some have worked at the center since their sophomore year — has been highly regarded by prospective employers.

The university has found that hiring its own graduates as full-time programmers has its benefits also. They are familiar with the system and can become fully productive in a short time. Two recent graduates are currently employed at the college full-time as programmer/analysts.

Roth is a faculty member at Taylor University.

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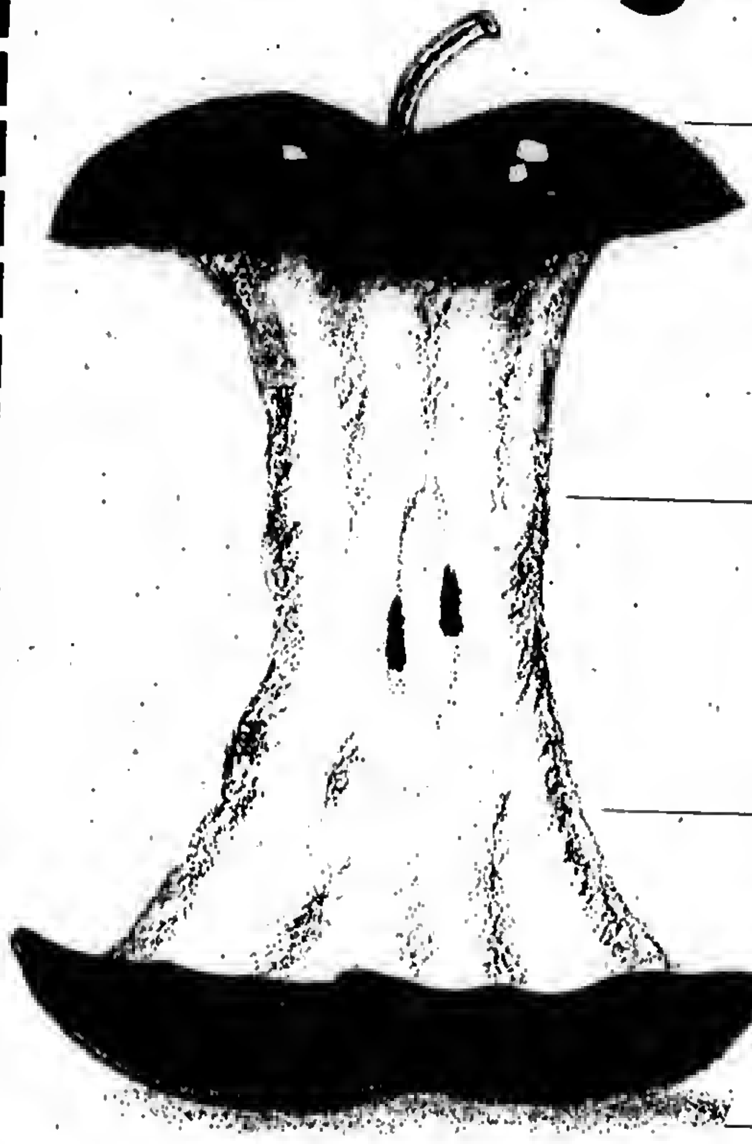

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Imagination, Control Can Trim Forms Budget

By H. Frank Coffman
Special to CW

When top management sends down the wurd that the forms budget must be stretched, where do you start?

Forms probably account for the largest single supply budget item, but you need them — for recording, for reporting, for testing, for all the jobs that must be done for all the other departments. And if your forms are nuw being purchased at the lowest price possible, how can you stretch this budget any further?

The key phrase here is "lowest price possible," and the answer to the question posed may well lie in how you and/or the director of purchasing understand forms costs. The money you pay the vendor is but one element of forms costs and probably the smallest one at that.

There are a number of other factors that contribute to the complete cost of forms and their usage. So there are probably many ways in which you can reduce the seemingly irreducible cost per thousand forms. It all comes under the broad heading of forms control, which is not, contrary to popular opinion, simply inventory control.

If yuu really want to get more for your money from forms and stretch that budget to meet management's request, it would be worth your while tu take a closer look at your total forms costs. Here are a few guidelines to help you get started.

While stock forms constitute the greater volume in your area, the custom-designed documents eat up a larger portion of the forms budget. Nevertheless, there are ways to save in both areas.

More Lines Per Inch

Most companies have established their price levels for stock forms and, order by order, bids will vary little over a period of time. But there are possibilities, primarily through reducing the quantities you need to buy and small gains here and there can add up significantly over a year's time. Printing eight lines to the inch, for example, instead of the normal six, can really make a dent in the volume of stock forms being used. The programming changes are usually minor, little readability is lost and you will gain considerable printing space.

Another suggestion is to make use of both sides of single-copy stock forms for running tests and similar one-shot operations confined to the computer room. Instead of tossing several hundred pounds of paper into the bin, turn the forms over and use them again.

It could be advantageous to check the usage of the multiple-copy stock form repotts that are prepared daily. Are all copies really needed? This may be a sensitive area and require diplomacy on your part, but our experience has shown that in many cases, report copies are simply thrown away without even being looked at. The need that may have been real at one time has long since passed and no one bothered to advise the DP department.

Give some thought to using lighter weight papers in stock forms. If you're currently getting 20 pound stock, check into the possibilities of 15-pound.

Now look at those more expensive forms, the ones that must be designed to meet specific requirements. They range from payroll checks to customer status analyses, from purchasing paperwork to production reports. They also include any number of special effects like magnetic ink or optical character printing, die-cuts, perforations and so on. They also come in a wide variety of sizes, styles and plies. It's easy to get lost in this jungle if you are not familiar with the terrain.

There are so many possibilities here that we must confine ourselves to the major ones (and the prime consideration is experience in this field).

Print Cycle Analysis

A good starting point is with something called Print Cycle Analysis [CW, Jan. 17]. The basic idea is to design those expensive forms so they require less time on the high-speed printer. This is done by eliminating spaces between print lines, rearranging print lines that have the same data, combining print lines, printing documents side by side and in other ways. The details should be reviewed.

Inventory control is basic to budget control. You must know what you have on hand, what you will need in the near future, how to get needed forms fast and so on. Without an organized approach, however, there are many traps into which you may fall.

It is well-known, for example, that the longer a printing run is for a forms manufacturer, the lower the per thousand cost of the form. This, unfortunately, leads many companies to order a year's supply of a form, sometimes two or three years, in order to get a price break. Then the inevitable happens and the forms must be changed in one or more aspects and you are stuck with thuusands of obsolete forms plus storage costs that constitute complete waste.

On the other side, there is the danger of not ordering enough or failing to keep adequate recurds of usage. Suddenly you run short of a form and have to order it on an emergency basis. This is usually costly.

How can you order, say, a six-months' supply of a form and still get a volume price break? The answer to this lies in something called grouping. This requires a complete review of all forms with the object of redesigning them to standard sizes, the fewer the better. You may be surprised at the wide variety of form sizes you have and how easy it can be to standardize on three or four sizes. These can then be ordered all at the same time to obtain the desired volume price break.

Ordering for price breaks through grouping of sizes also requires the standardization of order dates. Some old forms destined for standardization may be in surplus: others may be running low.

Of necessity, the grouping objective carries with it the need to redesign forms, and while striving for size standardization it can be profitable to include other elements of design or redesign aimed at cutting costs. As in the stock form area, determine if all the copies printed are actually needed and look into printing eight lines to the inch so form sizes can be cut.

The number of copies acquired is particularly important when dealing with high-speed printers. Depending on the model, a printer usually has a limit as to the number of copies it can accept and still give readable impressions on carbons. Very often the DP department finds it has to run the same form twice because too many copies are needed. If the quantity cannot be reduced, then think about the possibility of having the form produced in a side-by-side or two-wide configuration.

There are many other design ideas that can help either bring a form into standardization with others or simply reduce its size to use less paper. Consider the possibility of back-printing.

Another ploy is to redesign a form to do double or triple duty. This is a very good possibility with reports. In many cases the differences in the data to be accommodated on various reports are small. A good forms designer can produce a form that may be used for a variety of reports, even if column widths differ.

These are just a few of the ways and means available to the DP department head to reduce costs in the forms area. Many companies have found that for years they have been missing a good bet and that cuts of upwards of 10% or more in annual forms costs are quite reasonable to expect if they are organized and are able to approach the problem correctly.

Coffman is the manager of continuous product marketing for the Standard Register Co., Dayton, Ohio.

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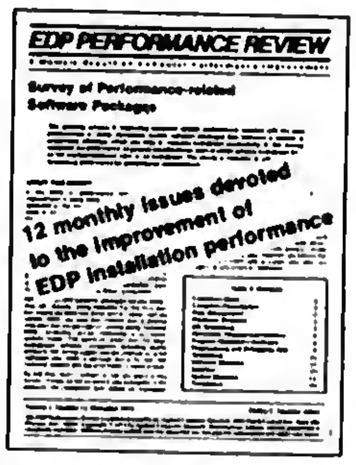
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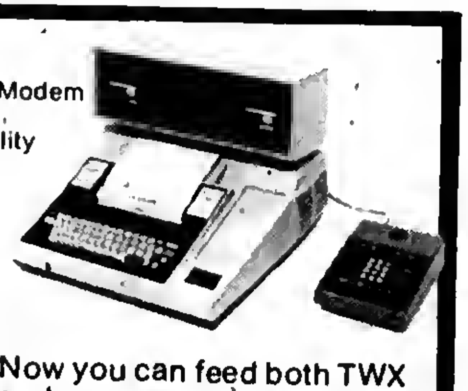

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Hierarchy of Modules

Structured Design Ensures High Quality System

By Raymond C. Fish
Special to CW

It has long been felt that the only way to design high quality yet inexpensive systems was to design and implement modular systems.

As recently as eight years ago, there was no specific formula or method for designing such a modular system. The only help that was offered to a system designer was "... approach the task in a certain frame of mind." Since that time, many firms have implemented modular systems, even though most would probably disagree as to exactly what modular really means.

The current consensus seems to be that a system or program should consist of a group of highly independent single-function modules arranged in a descending hierarchy. The problem is, with few exceptions, no one is able to specify exactly how the hierarchy is derived. Furthermore, given two modular solutions to a user problem, few can actually determine which is the better solution.

'Subjective Process'

Many DP professionals believe there really is no problem at all and that the concept of modularity is, by nature, intuitive. They believe anyone can build a modular system simply by placing each system function in a separate module and by making each module as independent as possible from all the others. Yet when asked exactly how this is done they can only answer that "it's a subjective process,"

In fact, the traditional design process itself (modular or not) has always been a subjective process. When presented with the functional specifications for a proposed system, the analyst/programmer will first decide the nature of the system (on-line, batch, etc.), then the procedural flow of the system (how many programs and what they will generally attempt to accomplish) and, finally, the way in which the data will be stored and maintained on the various files.

Once these decisions are made and documented, the general design is considered complete. The detail design phase can begin and the team can decide exactly how each program should be constructed in order to achieve its purpose.

The traditional nonstructured "modular" design is better than no design at all, but results are often less than satisfactory. The project team seldom delivers the system on schedule, the user feels the system does not accomplish all it intended to accomplish and the maintenance programmers are immediately saddled with a system that is difficult to maintain and modify.

What we need, therefore, is an approach to formal design which will produce structured modular systems that are inexpensive to develop, highly reliable and easy to maintain or modify.

This approach will have to describe the exact procedure for defining a system as a hierarchy of modules. It will have to specify criteria for judging how strong (or single-functioned) each module is and criteria for judging how independent the modules actually are. Such an approach has been formulated and it is called structured design.

Relationships Analyzed

Structured design is concerned with both the relationship of the pieces of the problem to the pieces of the solution (or "system") and the interrelationships among the pieces of the solution. It is an approach to the design phase of system development that includes the following concepts and techniques:

- The idea that a system can be defined as a hierarchy of highly independent, single-functioned modules.
- A strategy (or group of strategies) to produce such a hierarchy by refining each function into its constituent subfunctions, according to a formal theory of "modular" systems behavior.
- A method of graphically representing a completed or in-process design as a "structured chart." The structure chart is both a form of documentation and a tool for aiding the design process.
- A measure (called cohesion) of exactly how "strong," or single-functioned, each module actually is.
- A measure (called coupling) of exactly how interdependent the modules actually are.
- A set of guidelines, or heuristics, that can be used to distinguish the best design among several alternatives.
- A strategy (called packaging) for partitioning the completed systems design into individually executable load units (or programs).

The objective of applying structured design is to decrease the complexity of a proposed system. While traditional "design" methods will produce a system that is far more complex than the problem the system intends to solve, the application of structured design will produce a system that is no more complex than the actual problem itself.

This reduction in complexity will subsequently result in significant cost reductions during implementation and in a system that is more reliable, easier to maintain and easier to modify than otherwise possible.

Formal Design Technique

The achievement of less complex, inexpensive systems is only possible through the use of formal design techniques, such as those found in structured design. There are a significant number of improved productivity techniques in use today, but none of them will achieve optimal results unless a complete formal design has been accomplished. These techniques are entirely independent of, and yet completely compatible with structured design.

It is a common misconception that structured programming is equivalent to structured design. this is, however, completely false.

In fact, structured programming, although highly desirable, will produce mediocre results if not used in conjunction with a formal design methodology like structured design.

Fish is an account representative with Keane Associates, Inc., Boston, Mass.

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Short Search for Software Can Be Fruitful

(Continued from Page S/6)

installations there are, the more bug-free the system will generally be.
free the system will generally be.

- What modifications are necessary for installation? If there are any, they will cost you money. Find out how much.
- Is there a cost for evaluation? This should have been stated up front, but it never hurts to ask.

Once you have qualified both the company behind the product and the product itself (all of which can be done on the telephone), you are ready to institute other shortcuts that will get you to that successful software goal.

Shortcut number two is to use the vendor as a consultant. Chances are very good that after you have qualified the vendor down to this point, he can give you excellent ideas on how to use the product.

Ask for user references in your industry and with your specific machine type and operating system. You can rely on the experiences of others in this business.

The vendor can be used as a cost-free consultant during the process of software acquisition. He is a walking repository of information on cost-justifying his products, studies that show the benefits of his products, experiences of others both with and without this product, etc.

It is also common and fair to ask each vendor about his competition, not to downgrade another product, but to illustrate the superior or unique aspects of one product over another.

Shortcut number three is to use your associations. Employees of your organization probably belong to several DP organizations. It could save you a lot of time to poll the membership of those organizations by mail to ask of experiences with a specific software product. Several organizations regularly publish catalogs of such information for members.

In addition, it can be a very worthwhile experience to probe the experiences of fellow professionals at large user group meetings such as Guide, Share and Common. You can be assured that the opinions you gather there will be candid ones.

Shortcut number four is to poll your industry. Certainly you know the members of your industry are involved in DP. You may be on first-name terms with people at those other companies. It is a relatively easy matter to draft a letter and a one-page questionnaire to be sent en masse to all of those DP people.

Ask them their recommendations for a specific situation and why. The best answers will be obtained from people who are quoting from firsthand personal experience.

Shortcut number five is to poll your employees. Chances are, if you have more than five people in programming and management in your installation, some of the people are relatively new. Chances are, also, that they have had software experienced elsewhere in the DP industry.

It won't take long to ask your people if they have familiarity with any of the packages you are considering. By no means should their opinion be the last word on the system evaluation, but their input can certainly give you some direction as to the questions that should be asked across the board.

Shortcut number six is to pay a consultant/software broker for information. This isn't the most economical way to evaluate software, but it is less expensive than subsidizing your own evaluation research. The one true way for this shortcut to have a true net effect for the searcher, however, is to check more than one source or commission, more than one study. No matter how objective any one source might try to be, that source is limited in its knowledge and if there is one thing you don't need when evaluating software, it's half knowledge of a topic.

The key to success involving these shortcuts is reliability of your peers and the information they have been able to gather through firsthand knowledge of various software systems.

Landgraf is executive vice-president of Pansophic Systems, Inc.

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Microcomputer Systems Introduces The MSC-1677. A Disc System With Big Capacity, High Reliability and Super Savings.

Our MSC-1677 is a high-power, low-cost hardware combination that delivers all the mass disc storage you require to keep your HP 3000 working and profitable. Part I of this attractive subsystem is our own super-sophisticated MSC-1000 disc controller, a product of advanced microprocessor-hased technology—and a product field proven to be the most reliable and maintainahle in the business.

Part II is Memorex's impressive 677, a 200 megahyte disc drive that boasts a track record of over 15,000 successful installations. Together, these parts form a package that is totally hardware/software transparent under MPE—and totally superior to the disc package HP offers with the Series II.

Sometimes, Two Rocks Are Better Than One.

We know what you're thinking. Single-source systems, particularly Hewlett-Packard single-source systems, can make one feel very warm and cozy. But warm and cozy can turn uncomfortable and unprofitable in a hurry. Because it doesn't make a lot of sense to pay for the security if the system doesn't deliver the storage you need. Particularly when you can get both the security ond the storage by working with us and our working partner, Memnrex Corporation—like HP, a rock to be reckoned with.

Memorex, long known as the "memory/excellence" people in the IBM-compatible marketplace, has helped us make the HP 3000 a sensible, reliahle, cost-effective alternative to IBM mainframes. Perhaps more than anyone else, Memorex has "written the book" on the successful installation of disc subsystem add-ons. They have, in large measure, shown the way in making "mixed vendor" systems preferable instead of just tolerable. They've done it with support—before, during and after the subsystem installation.

But most of all, Memorex has done it with the product.

HP-3000
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HP-3000
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Sometimes, Two Drives Are Better Than Six.

Particularly if they are Memorex 677 drives. This 200 megabyte, single spindle, disc storage drive is the product of three generations of Memnrex disc experience. And it is the one product that has been installed more often than any other of its kind—count them, over 15,000 units at work for customers today.

No question. This is exceptional, feature-laden hardware. But what is more important to you is this: with 150 megabytes each of usable storage, two *677's will dn the work of six HP 7920 discs.* That can mean upwards of 50% cost savings nn the initial drive purchase alone. It can also mean dramatic increases in the mean time between failure. Because, over and above the proven reliability of the 677, two electromechanical devices are simply going to break down a whole lot less than six.

Your HP 3000 Will Never Know How Much You Are Saving.

Thanks to Microcomputer Systems MSC-1000 disc controller, which emulates the presence of the biggest drive

With Unplanned Application

Importer of Frozen Seafood Nets Bonus Catch

SAN DIEGO, Calif. — Like finding the proverbial pearl in an oyster, Ocean Garden Products, Inc. here has netted an unexpected bonus by using its small business system for in an unplanned application.

The frozen seafood importer originally bought its system to handle routine accounting functions. The system has since been given the extra job of controlling sales traffic by determining which cases in a given warehouse should be removed to fill incoming orders and then issuing sales invoices as the goods are shipped.

Founded 20 years ago, the firm has been using computers for accounting for more than a decade, according to controller Frank Barrancotto. At one time an IBM System 360 was leased but "it was too big and too expensive. However, our sorting and computational needs are so high that nothing smaller would do," he said.

A switch to a service bureau followed, with Ocean Garden personnel punching cards that were sent to the bureau for handling. "This had drawbacks, too," Barrancotto said, "since it didn't give us an interactive capability, which is particularly important in terms of checking customer records or reviewing transactions. The service bureau was performing a simple historical function compiling data."

In mid-1972, Ocean Garden had a management consultant conduct a study to determine an economical, flexible accounting system. Initially, a Basic/Four Model 400 was recommended, and since then the company has upgraded to a Model 600.

The Model 600 is at the food company's headquarters to prepare data for the IBM 360 used at the local service bureau. This enables the accounting department to work with elementary data in its offices, yet have the 360 to process as much as 100,000 records at a time.

The present Model 600 system consists of one CPU, six CRTs, two 200 line/min printers, one paper tape punch, one magnetic tape and two disk drives.

About a year after installation of the original system, Barrancotto and his staff began toying with the notion of using the computer to handle sales traffic from the warehouses in which Ocean Garden stores its imported frozen products. The sales inventory control system went live in September 1976.

In discussing the order entry aspects of the system, Barrancotto explained that as orders are received, sales information is typed onto the video display terminal and entered into the customer files. While this data is being reviewed and adjusted, the system is also performing accounts receivable functions. The Basic/Four system maintains a perpetual physical inventory of what lots of products are in which warehouses, and a salesman decides from which warehouse to take the goods, but the computer selects the cases to take.

The decision is based on three criteria:

- The lot storage dates and when the space rental for various cases will lapse.
- The age of the products, based on when they entered the U.S.
- The size of the lot being ordered in relation to the tariff structure of the specific warehouse.

In what Barrancotto describes as an unusual process, the minicomputer punches out tape to drive a remote printer that advises the warehouse on which lots to pull and where to send them. This same information is also used by the mini to produce written confirmation records for the broker or the firm's own sales office, the trucker who will transport the shipment, the warehouse from which it's released and the final destination.

"Our sales inventory system plus the computer's ability to weight 40 to 50 lots in seconds contributes to the most efficient use of our inventories," Barrancotto concluded.

3000 But... Between The Rock Hard Place.

HP can offer, the 50-megabyte 7920—without emulating either its capacity or its overall cost. To the Series II, our 677 will look exactly like three 7920's. This means usable capacity of 150 megabytes per spindle, with up to eight spindles (or 1200 megabytes) supportable by one of our MSC-1000 wonders. It also means that no customized, non-HP software is required to do the trick. You'll never have to worry about staying up to date with future HP software enhancements to the 3000.

HP 3000 SERIES II
677

Disc Subsystem Comparison Chart

Feature	HP 7920	MSC-1677
Software Transperent under MPE/DS-3000	Yes	Yes
Microprogrammed Controller Architecture	Yes	Yes
Full ECC (error correction)	Yes	Yes
3330 Disc Technology	Yes	Yes
Capacity per spindle (megabytes)	50	150
Reliability	Good	Much Better
Complete Maintenance Support	Yes	Yes
Price	Competitive	Super Competitive
Number of installed spindles	Less Than 1000	Over 15,000
Operator oriented self-testing capability	No	Yes

Rock-Solid Support. Around The World and Across The Board.

You are still saying to yourself: "Sure, you have significantly more installed spindles out there than they do. And yes, simple math tells me that the MTBF on yours will be a third of theirs. And granted, I could save upwards of 50%, even 100% on drives alone. But what about once it is mine and no longer yours and something just happens to . . ."

Relax. Customer support is guaranteed. In spades. Don't forget one of the rocks on which we have built this ad. And this product. Memorex Corporation is committed to support the MSC-1677 program with its vast service organization—a sophisticated interweave of skilled people, strong technical support and a logistics network bound together for a single purpose: immediate customer response.

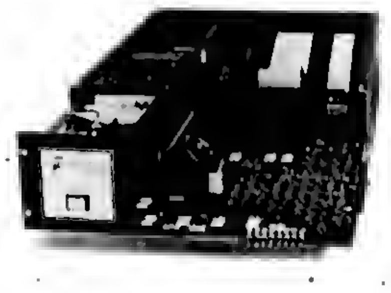
Beyond them, there is us. And our team of HP 3000 experts, backed by a fully functioning HP 3000/II System that can "acceptance test" subsystems, "systems test" spare parts, reproduce failures or anomolies so as to quickly analyze and troubleshoot problems at the system level.

Once again now, Memorex and Who?

Memorex and Microcomputer Systems Corporation. The people who forked out over three grand for this ad space because we think the MSC-1677 Disc Subsystem is something data processing decision-makers should know about. (We'd also like to sell a couple.)

In the coming months, you'll be hearing more from us. And not just in the HP 3000 peripheral add-on marketplace either. Dedicated to the continued "conception through production" development, generation by generation, of micro-programmed controllers a year or two ahead of the industry, we are already hard at work in the 317 mb and 630 mb Winchester technology arena.

Beyond our individually marketed controllers, we will continue to work with "rocks" like Memorex Corporation developing products like the MSC-1677. After all, wasn't it a rock that helped David take the steam out of a fellow named Goliath?



Call our President, James Toreson, at (408) 733-4200, to find out more. Or write Microcomputer Systems Corp., 440 Oakmead Parkway, Sunnyvale, CA 94086.

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*Phone*____________________

Mini Bits

Commercial Applications Set as Five-City Course

NEW YORK — "The Commercial Application of Minicomputers" will be the topic of a course given by the American Management Associations in five cities this fall and winter.

The course will be held in Chicago, Sept. 26-28; New York, Oct. 26-28; Los Angeles, Nov. 7-9; Atlanta, Dec. 12-14; and San Francisco, Feb. 8-10.

The coorse costs $425 for members of the organization and $490 for nonmembers. Teams from the same company can be accommodated at a redoced rate.

The organization is located at 135 W. 50th St., New York, N.Y. 10020.

DG Sets Seminars

WESTBORO, Mass. — A series of seminars discussing the minicomputer as a management tool will be presented in several cities this fall by minicomputer vendor Data General Corp.

The seminars will address the ways minis can help businesspeople deal with inflation, competition and government regolation, according to a spokesman. Included in the three-day meeting will be a demonstration of the firm's small bosiness system.

Seminars will be held in New York, Sept. 27-29; Philadelphia, Oct. 4-6; Chicago, October 11-13; Atlanta, Oct. 18-20; Dallas, Nov. 1-3; Los Angeles, Nov. 15-17; and San Francisco, Nov. 29-Dec. 1. Additional information is available from DG, Route 9, Westboro, Mass. 01772.

Common to Meet in Boston

BOSTON — Common, an IBM users groop, wil. hold its fall conference Oct. 9-12 here.

Common members who use IBM 3, 7, 32, 1130, 1800 and 5100 systems as well as DOS/VS and OS/VS are orged to attend the conference, which will feature over 50 sessions consisting of users and IBM speakers addressing varioos DP topics, a spokesman said.

Several sessions will be devoted to the System/34 and Series 1. A luncheon presentation by Robert A. Yellowless, director of worldwide requirements for the General Systems Division, will give General System's perspective on the futore of DP.

Information on the meeting is available from David G. Lister, Administrative Director, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Storage to 128K

IBM Enhances System/34

By Esther Surden
Of the CW Staff

ATLANTA — IBM's General Systems Division has announced several enhancements to its System/34 small business system, originally announced in April. The enhancements were designed to provide additional storage — up to 128K bytes — and allow the attachment of up to 64 remote workstations via ordinary telephone lines.

The enhancements are said to solve some of the major user-oriented weaknesses in the system that have been pointed oot by industry observers.

IBM also added application programs for manufacturing and distribotion as well as another version of its 5251 CRT workstation, the Model 12.

The Model 12 stations, which must be used to take advantage of the System/34's communications options, allows users to link remotely located workstations with a central data base and use common application programs, IBM said.

With the additional storage capacity, users can now opt for either 96K bytes or 128K bytes of storage. The previously announced top capacity for the system was 64K bytes.

Also added to the system was a second communications line. This second line can "balance traffic on the communications line or provide concurrent data processing from remote workstations while commonicating with other systems," IBM said.

The workstation can be attached to either or both of the commonications lines. It features a 1,920-character screen, keyboard, field highlighting and data editing and serves as the communications controller for additional workstations at the remote location.

Up to eight workstations, which can either be IBM 5251 CRT stations or 5256 tabletop printers, can be attached to each remote Model 12. The System/34 can address op to 64 workstations attached via communications lines and op to eight attached directly.

The Model 12 provides communications control functions and can be located wherever common carrier facilities can be installed, IBM noted. Communications with the System/34 is via Synchronous Data Link Control protocol.

The clostered 5251 display stations or 5256 printers can be located up to 5,000 feet from the display station serving as controller, a spokesman added.

Prices for a System/34 range from $32,700 for 96K bytes to $47,220 for a 128K-byte system. Monthly rental ranges from $962 to $1,413 and monthly lease prices from $875 to $1,285.

First deliveries will be in September of next year, IBM said.

The second communications line adapter, scheduled to be available in January 1979, will cost $2,880, $88/mo to rent or $80/mo to lease.

The 5251 Model 12 CRT station with keyboard featore and electronic interface adapter also will be available in January 1979 for a purchase price of $4,830, monthly rental of $165 and monthly lease of $140.

One of First System 700 Users Pleased by 'Big-Time Features'

By Esther Surden
CW Staff

LOS ANGELES — One of the first osers of the Basic/Four Corp. System 700 said he is pleased with the system's ability to provide his company with increased capacity and "big-time computer features."

According to Charles Smith, vice-president for DP at American Insurance Consultants, Inc. here, the Basic/Four system is a sophisticated one that fits his firm's needs. A former Model 600 user, Smith recalled that "we could have increased our capacity on the 600, but we would have reached the limit in another six months."

The firm was foonded in 1969 and performed all applications manually until 1972, when it went to a service bureau. The 600 was installed early in Dec. 1975.

The System 700, announced about a year ago [CW, Oct. 4], was delivered at the end of April to the user, an administrator of groop health and accident insurance. The system performs monthly billing and cash receipt applications; it also reports to carriers on moneys collected and aids in claims processing and check writing.

Present hardware at American includes the CPU with 72K of memory, five CRTs, foor 75M-byte disks with 150M Bytes on-line and a 1,300 line/min printer.

Smith said conversion from the 600 to the 700 has been "simple," although "it does take time." First programs are converted at Basic/Four's office. "You can hook the 600 to the 700 to convert files directly," he explained.

The 700 was attractive to American because "you can control videos off of the central unit, designate who you want to use the videos and hook more of them into it."

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Using Effectiveness Grid — Part 2

Method Promotes Organizational Enrichment

By Carl Masi
Special to CW

One of the most important future issues in any organization is one that has been virtually impossible for users to implement in the past three decades because of the limitations of the technologies used. That issue is known as organizational enrichment. This is a "quality of life" matter that is becoming increasingly more important.

Surely the day of the keypunch person pounding only little rectangles in little cards eight hours a day is finished. Today's products make it much easier to give that person more satisfaction, more dispersed responsibility. People need responsibility to excel and more authority, at least commensurate with expanded responsibility.

This is the second part of a two-part series on using an effectiveness grid to determine distributed processing methods.

Equal in subtlety, as well as importance, is the fifth major issue — policy impact. And it may be a polite term that expresses what has to be the biggest worry of distributed systems planners: "Are we opening a Pandora's box of loss of control of our total operation?"

Who decides what equipment will be selected initially, with what capabilities and for what applications? That in itself is difficult to decide. Just think how much more difficult it will be a year or two from now when time and need will have altered the priorities of each local site.

Another issue is cost allocation. Who pays for what increment of hardware? Will it be that far-off branch office, its parent department or the DP group?

What costs will be allocated, to whom, under what criteria. These, we all know, are extremely complex issues.

Another policy matter is vendor/user relationships, and this issue escalates in complexity in direct relationship to the utilization of equipment by multiple sites. Matters of concern here include: Who do we call to fix a software bug — the home office or the local software expert? Who do we call when we want to add more memory?

Another area of concern is the degree of local user authority a corporation is willing to give to operating field management, and still another is displacement policy.

For example, a distributed site has been in for a year. The office at which it is located has grown rapidly. It needs more processing to go along with the central site services it receives. Who makes that decision? In what time frame? Under what selection criteria?

And what about single vs. multiple vendor policies? Should there be one or many policies? Under what circumstances?

The final issue is productivity measurement. Distributed processing only makes sense if it allows an organization to function more effectively in one or more ways. But in terms of measuring sought-after benefits it is important to assess the related and sometimes overlooked matters of initial hardware costs, plans for full utilization of the new asset, benefits of displacing existing services, effects of new skill requirements on salary levels, cost implications of total new systems development and the cost/-resource requirement for maintaining the new system.

This article was excerpted from a speech delivered by Masi, director of product marketing for Wang Laboratories, Inc., Lowell, Mass., at a recent conference.

Mapping Mini Helps Assessors In Switzerland

KANTON AARAU, Switzerland — A minicomputer-based mapping system will soon be helping tax assessors here better determine the value of land and buildings.

The system is being used in what is called a "municipal cadastral application." A cadaster is the total information known about a piece of property — usually expressed in the U.S. in the form of a title insurance policy, a spokesman explained.

Until recently in Kanton Aarau, title records and tax information were maintained by hand ledgers. Consequently, there was a backlog for updating the records — often years.

To cope with this problem, Aarau purchased a Calmagraphic interactive data management system, which is being used to "digitize" (convert to computer code) each individual parcel of land in the city, its zoning, its use and its ownership — in some cases going back as far as four or five centuries.

"This program started in June 1976 and will continue through May 1977," the spokesman said. The digitized information is then stored on magnetic tape where it can be recalled and presented on the Calma system's CRT or in hard-copy map on its high-speed plotter.

Computer Optics announces a new 3270 feature.

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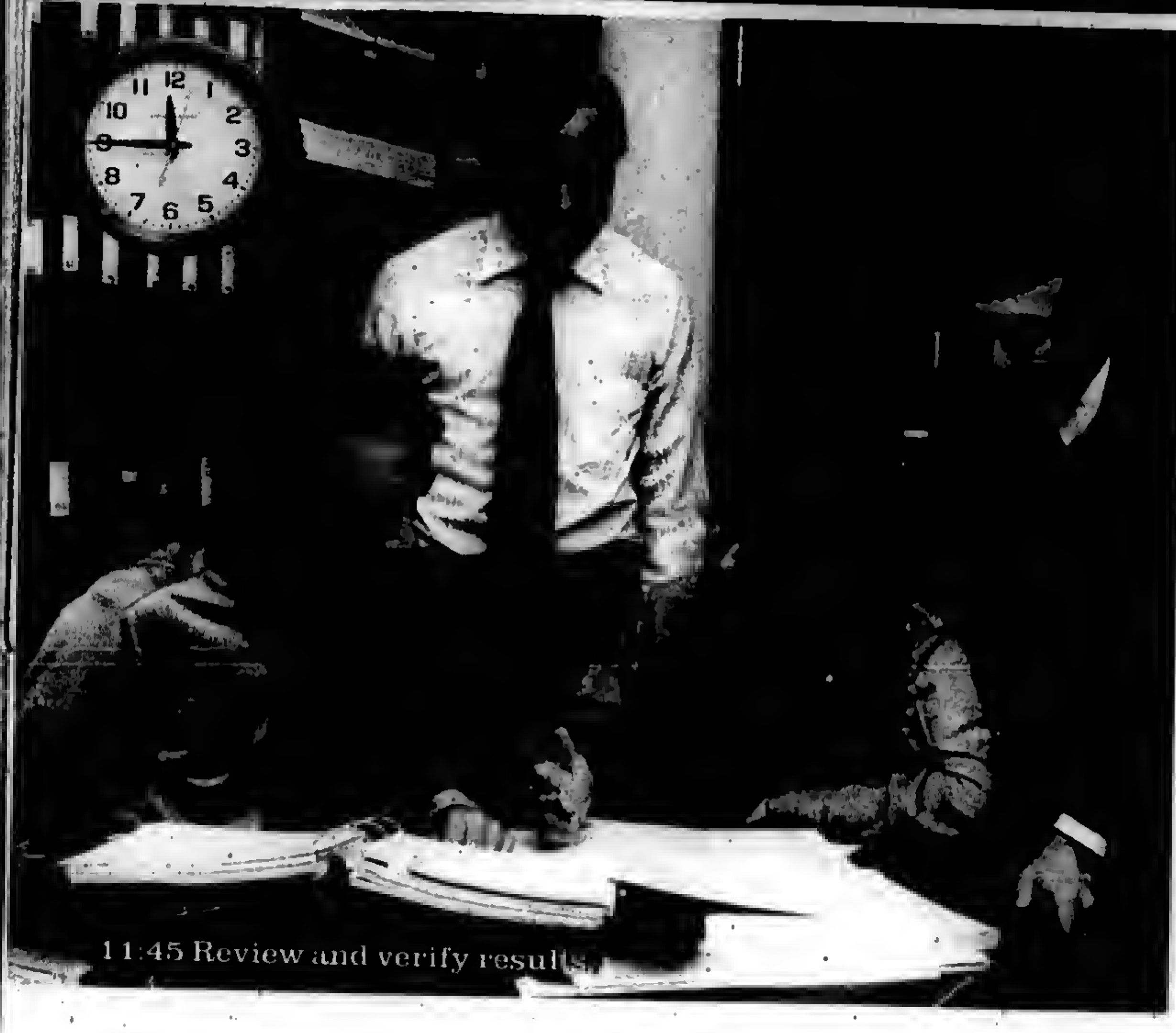
11:00 Q&A session to learn computer set up.

11:15 Load and test IDMS.



11:45 Review and verify results.

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*say users in Datapro study

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We were rated "easiest to install" because IDMS goes in in one or two hours – not one or two weeks like IMS or DL/1. This is possible because we've worked hard to develop a simple installation process. Yet it's thorough – every system module is proved operational on your computer system.

Following installation, you also get a three-day training session in IDMS for as many of your people as you want. This training program was rated #1 in the Datapro study. For the complete story – including technical literature on IDMS and a schedule of seminars for your area – send this coupon, or phone us at (617) 237-6600.

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Mini-Based Units Read Pages, Documents

SIMSBURY, Conn. — Scan-Optics, Inc. has two mini-based optical character recognition (OCR) systems designed for small business users or large companies in which data entry requirements are distributed among many locations.

The System 506 and System 515 operate off-line and read both pages and documents. They can be operated "by regular office personnel with a minimum of training;" the company claimed.

Each system includes a CPU, optical scanner, floppy disks and graphics CRT and keyboard terminal for key entry or video image capture.

The 506, which can process up to 30 documents per minute or three pages per minute, costs $52,490 in its basic configuration. The 516 can process up to 60 documents or 7.5 pages a minute, the firm said. It costs $72,650 in its basic configuration.

One-, two- and three-year rental plans are available. The 506 rents for $1,587 monthly on a three-year lease, and the 516 costs $2,177 per month on the lease plan. The company is located at 22 Prestige Park, E. Hartford, Conn. 06108.

Controllers Fit DG Minis

BEDFORD, Mass. — Aviv Corp.'s TFC 701 and TFC 702 imbedded magnetic tape controllers can now be used with Data General Corp. minicomputers.

The controllers are transparent to the DG operating system, the firm said, and are inserted in the DG chassis.

The TFC 701 provides NRZI recording for standard tape drives with speeds of from 12.5 in./sec to 125 in./sec. It costs $2,500. The TFC 702 gives users both NRZI and/or phase-encoded recording techniques over the same speed range and costs $3,300.

The controllers are provided with documentation, diagnostic software, installation instructions and cabling, Aviv said from 300 Sweetwater Ave., Bedford, Mass. 01730.

Graphics Card For HP Minis

CUPERTINO, Calif. — The Intermedia Systems Model 4422 Graphic Video Generator I/O card for Hewlett-Packard 2100/MX and E Series systems is contained on a single circuit card.

Using the unit, the display data is stored in a local screen refresh memory. The random-access memory allows plotting in excess of 300,000 point/sec, the company claimed.

Software includes a Fortran-callable graphics library, drivers for all HP operating systems and a device diagnostic, the firm added.

The unit costs "less than $2,000," a spokesman claimed from 10601 S. Saratoga-Sunnyvale Road, Cupertino, Calif. 95014.

Turnkey Aimed At Novice Users

MILWAUKEE, Wis. — The Mesa Two from A.O. Smith Corp. is a turnkey small business system that comes with a library of accounting programs designed for first-time users.

The system, which the vendor says carries the name of a product formerly sold by Martin Wolfe, Inc., is based on Data General Corp. hardware. Software provided includes packages for accounts receivable, accounts payable, inventory, payroll, general ledger and sales analysis, according to a spokesman. Audit trails are provided from financial statements, he added.

The system can communicate to a larger mainframe if needed in a distributed processing appplication, the vendor noted.

The minimum hardware includes a 64K CPU, a 165 char./sec printer, a CRT and 10M bytes of disk. The system costs $57,000 including software. Prices range upward to $100,000 depending on options selected.

A.O. Smith noted that the system will be ready for delivery in five months. Its Data Systems Division can be reached through P.O. Box 584, Milwaukee, Wis. 53201.

900 Line/Min Printer Suits Range of Minis

FORT LAUDERDALE, Fla. — A 900 line/min impact printer that interfaces to Data General Corp., Digital Computer Controls, Digital Equipment Corp., Interdata, Hewlett-Packard and Lockheed Corp. minicomputers is available from Southern Systems, Inc.

The unit accommodates up to six-part forms. It costs $15,440 including control logic, buffering, interface and cables from the company at Suite 309, 3000 N.E. 30th Place, Ft. Lauderdale, Fla. 33308.

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TI's new portable means remote

Until now, remote order entry meant expensive on-line operation with a computer via a telephone line.

But TI has changed all that.

The new *Silent 700** Model 765 Portable Memory Terminal has built-in bubble memory. So it can remember, even when the power is off, while it waits to talk to your computer.

With the 765 you can enter sales and order information all day long using the typewriter-like keyboard.

Then you can edit when you have time.

The 765's powerful, yet easy-to-use text-editing functions let you add, delete, locate, and correct data on the spot. So you can transmit more accurate data when the phone rates are lower. At a fast 30 characters per second.

Traveling companion. Lightweight portability is the key to convenient field use. And at 17 pounds, the 765 is really compact.

But it's no lightweight when it comes to features. With its built-in numeric cluster, keyboard with upper and lower case characters, quiet 30-cps printer, and acoustic coupler for telephone connection, the 765 is a heavy-duty operator.

And the 765 gives you plenty of storage space. The basic terminal comes with 20K bytes of memory. And it can be expanded to 80K bytes—the equivalent of up to 20 fully typed pages.

System Helps Firm Triple Cash Flow Speed

VENTURA, Calif. — A small business system at Bruce's Transport Service here has tripled the speed of cash flow for this company and will pay for itself in three years, according to William Aulich, accountant for the firm.

The company's primary business is hauling oil well drilling tools and equipment. As such, it is regulated by the Public Utilities Commission (PUC) as well as the Interstate Commerce Commission. The reports these agencies require are extensive, and in addition to keeping track of all general accounting details, the firm must keep tabs on miles driven, weight carried and surcharges for each driver and each vehicle.

A small business system was clearly needed to provide this information. The company first installed an NCR Corp. 399 system which, according to Aulich, "never worked. We were very unhappy with the performance of both the hardware and software."

After eight months, the firm began surveying the field for another system that could do the job. It looked at IBM, Singer Business Machines, Burroughs Corp. and Digital Equipment Corp. systems and finally purchased a DEC Datasystem 310 in October 1976, Aulich reported.

The system was programmed by Mini Computer Business Applications of Los Angeles. The first set of programs were test run on the software vendor's mini, so "we were up and running as soon as we got the hardware in. The rest of the programs followed soon after."

The system will pay for itself in three years, Aulich predicted, through reduction in personnel needed, cut overhead and faster turnaround time on invoices. Staff has already been cut in half.

"We're turning our records around daily now, instead of always being five, six or seven days in arrears as we were when the accounts were being done by hand. Invoices which used to go out every three or four days are now going out daily.

"And since we're getting money back three times as fast, we're tripling the speed of cash flow," Aulich said. Payroll now takes three hours as compared with three days and accounts payable has been reduced to three hours from five days, he added.

Its versatility, dependability and cost sold the company on the system and it's a decision the firm feels was well made. In fact, the PUC has asked other firms of this type to come look at the system at Bruce's, Aulich said.

Mini Answers User's Demand For Job Control

REGO PARK, N.Y. — Sometimes the best system for the job isn't one touted by a major computer manufacturer; sometimes it's a system from a turnkey vendor that suits the particular needs of a user in a specific industry.

That's the opinion of John Bianco, head of accounting for Samson Management Co., a real estate management firm.

"Most systems you look at are designed to suit a multitude of purposes and to attack the biggest market," he noted. But the system his firm purchased was designed by people who knew real estate management.

The system has "produced almost everything we expected of it, with faster turnaround and much better control of our overall picture than before," Bianco said.

Switch From Bureaus

Samson switched from service bureaus that handled the firm's work over the years. Small business people should remember that "it's a lot more work" to own your own system. "You now have to contend with doing the work that the service bureau formerly performed." However, if you are willing to do this, an in-house system can be a "great improvement," he advised.

The equipment installed at Samson includes a VMAC II mini from Columbus Computing, based on a Data General Corp. Nova CPU with two disk drives, a Centronics Data Computer Corp. printer and three Hazeltine CRT terminals.

With the system, management can secure information on demand that previously was not available at all or very difficult to produce, Bianco noted. While service bureaus might have been adequate indefinitely, the company initially decided it needed this system to gain control over the general ledger which was maintained by a hybrid of service bureau computer and in-house manual methods, making it very difficult to analyze.

Development Effort

Thus, when the system was installed, the primary development effort was given to the general ledger, producing information available in response to inquiry.

"Real estate management is typically in the hands of family-run enterprises such as ours, with principals the dynamic sort who want what they want when they want it," Bianco said.

"When a pricipal asks for a June 30 rent roll on June 15, he may be only half-kidding. With a system in-house, you're not tied to the batch processing schedule of the service bureau. You go to your own terminals and printer and can usually generate what you need right away."

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Many people want a terminal with the features of the 765 for applications where portability is not required. So we designed the Model 763. A table-top version of the 765, the 763 has the same performance capabilities in a compact unit, and comes standard with either a TTY current loop or EIA interface instead of the acoustic coupler.

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And, the table-top Model 763 at $2,695† is another price/performance leader. Of course, quantity discounts and a complete range of lease programs are available.

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TEXAS INSTRUMENTS.

Minis Built for Governments

SPRINGFIELD, Ohio — Computer Systems and Services, Inc. recently introduced its System 88 series of minicomputers, designed for use in local government, manufacturing and distributing applications.

Three hardware packages are available for the unit, which is based on an Interdata 7/32 CPU. The Series 1 with 128K bytes of main memory, 20M characters of disk in two drives, two CRT terminals and a heavy-duty 300 line/min printer costs $58,900.

The Series 2 with 192K bytes of memory, 134M bytes of disk storage on two drives, two 9-track tape drives, four CRTs and a 600 line/min printer costs $110,000.

The third member of the family, the Series 3, has 256K bytes of memory, 512M bytes of disk, two industry-compatible 800-and 1,600 bit/in. tape drives, eight CRTs and a 1,000 line/min printer. It costs $192,600.

Available software includes packages for tax accounting and billing, treasurer's on-line receipt posting, collection and receipt reporting.

The firm assumes "single-source responsibility for hardware, software, user training, technical support and hardware maintenance," it said.

The system can be expanded from the smallest model to the largest without replacing the CPU, the company noted from Suite 403, 120 S. Linestone St., Springfield, Ohio 45502.

Ampex Has PDP Options

EL SEGUNDO, Calif. — Ampex Corp. has expanded its line of plug-compatible core memory systems for the Digital Equipment Corp. PDP-11/70 minicomputer with two additional models.

The ARM-1170 Model B is said to provide 64K to 128K words of memory in 5.25 in. of rack space, including power supplies and blowers. The unit enhances performance through two-way memory interleaving on systems equipped with 128K words or less of DEC memory, Ampex said.

The ARM-1170 Model C includes up to 256K words of memory in 10.5 in. of rack space, also including power supplies and blowers. It uses two- and four-way memory interleaving techniques to enhance performance, the vendor noted.

The systems are "totally transparent" replacements for the MJ11 and MK11 memories used in the PDP-11, he stated.

The Model B costs $12,875 for 128K words and the Model C costs $23,865 for 256K words. Ampex is at 200 N. Nash St., El Segundo, Calif. 90245.

HP Turnkeys Automate Labs

PALO ALTO, Calif. — Hewlett-Packard Co. has three mini-based turnkey laboratory automation systems using chromatographic software.

Designed for analytical research, quality control and process monitoring applications, the 3351B, 3352D and 3353A systems are incrementally expandable, HP explained.

The 3351B and 3352D include an HP 21MX processor with 16K words of memory, an A/D converter and a 30 char./sec printer and console with built-in dual cassettes.

The 3353A has a thermal line printer, CRT terminal with 12K bytes of memory and a dual tape cartridge.

The systems range in price from $10,000 to $24,800 HP said from 5207 Page Mill Road, Palo Alto, Calif. 94304.

MDB Controller Links HP 21MX, Printers

ORANGE, Calif. — MDB Systems, Inc. has a plug-in line printer controller for the Hewlett-Packard Co. 21MX.

The controller is said to be transparent to host computer diagnostics, drivers and operating systems. It is contained on a single circuit board.

The controller costs $850 to $1,250 depending on the printer used. It will operate with any printer that has a Centronics Data Computer Corp. or Data Products Corp. buffer emulator, a spokesman noted from the company at 1995 N. Batavia St., Orange, Calif. 92665.

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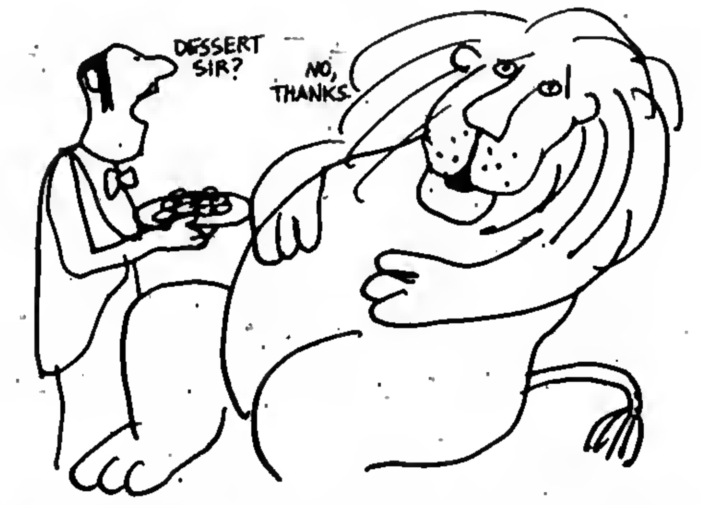
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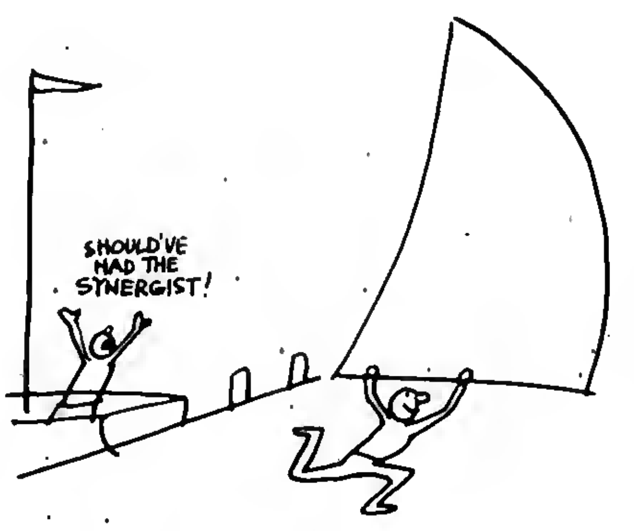
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With Micro Interfaces

Builder Shares Knowledge, Frustrations

By Doug Anderson
Special to CW

I own an Altair 8800 with 21K bytes of static random-access memory (RAM), a Processor Technology Corp. video monitor board, a Panasonic video monitor and two Shugart Associates mini-floppy disk drives with a North Star Computers, Inc. controller. In addition, I have a Practical Automation printer, a surplus Texas Instruments keyboard and modem, a Mits, Inc. EIA board for the modem and four-port parallel I/O board for the keyboard and printer plus a Cromemco 8K-byte programmable read-only memory (Prom) board with 5K bytes of Prom.

My Altair was ordered back in March 1975 and delivery took about three months. This was my first electronic kit and I did a number of things wrong. After about six months, however, with a lot of help, I got it to run simple programs that were toggled in on the front panel switches.

Things Learned

During the building of the kit, I learned a number of things the hard way: to wipe a soldering iron instead of filing it; that chips must be in sockets to facilitate replacement; that Molex, Inc. Soldercons were essentially useless for my purpose; that about 10% of all chips will eventually fail; and that dynamic memories cause far more problems than static memories.

I spent a very frustrating six months trying to get a Mini Micro Mart cassette interface to work — and failed. I ordered a different interface from Morrow's Micro-Stuff, put it together and it worked right away. That made life a lot simpler, since I am a software guy by nature and the operational cassette opened up new worlds. I could write and compile software. Since I initially didn't have a hard-copy capability, I would call up a terminal with an auto-answer modem and print there.

The cassette eventually proved a frustration, though, as the bit dropout rate was too high. I finally ordered a mini floppy and controller and sold the cassette board. The result was no more dropouts, and I was able to increase my productivity ten fold. I ordered a second drive and have plugged that one in, too.

I ordered a printer from the Digital Group and it proved to be a big disappointment. Althouth the hardware was good, the components provided with the interface were not. Two bad transistors caused the print head to burn out in 20 seconds flat. Also, the documentation was among the worst I have ever seen.

Self Zapping

The printer solenoids are driven by software. It is possible to stop the microprocessor unit MPU with the needle solenoids engaged and in 20 seconds they will overheat and zap themselves. Additionally, the routines provided did not work and were written in a nonstandard Assembler language and were not documented.

As far as software goes, I have extended Basic running as well as a disk assembler. I am currently debugging a disk-oriented text editor with automatic memory management. I have written and am using a disk I/O package that supports open/close/rewind, read/write blocks and get/put records. A

(Continued on Page 56)

INTERFACE CHART

COMPANY	PRODUCTS PURCHASED	QUALITY	DOCUMENTATION	DELIVERY	SERVICE	PRICES
Mits, Inc.	Altair 8800, various boards	Good	Good to Excellent	—	Slow	Generally Higher
Processor Technology	Sol System, various boards	Excellent	Excellent	Very Slow	—	—
Imsai	Imsai 8080	Good	Good to Excellent	Not Bad	—	High
Mini Micro Mart	Surplus Items, various boards	Poor	Very Poor	Not Bad	—	Low
Godbout Electronics	Chips, various boards	Good	Fair to Good	Excellent	Excellent	Low
North Star Computers	Disk drives, controller, Basic	Excellent	Good to Excellent	Good	Excellent	Middle to High
Technical Design Labs	Various boards	Excellent	Excellent	Good	—	Middle
James Electronics	Parts	Excellent	—	Excellent	—	Low to Middle
Poly Packs	Parts	Poor to Good	—	Fair to Good	—	Low to Middle
Cromemco	Various Boards	Excellent	Excellent	Good	—	Middle to High
Digital Group	Various CPUs, boards printer, cassette	Hardware — Good to Excellent Software — Poor to Fair	Poor	Poor to Good	—	Middle to High

Doug Anderson evaluates products and firms with which he has dealt in the past three years.

Micro Bytes

Osborne Publishes Programs in Basic

BERKELEY, Calif. — Osborne & Associates, Inc. has published *Some Common Basic Problems,* by Lon Poole and Mary Borchers. The book is a compilation of programs written in Basic that perform a variety of common tasks.

The book does not teach the user to program in Basic, and users can utilize the programs in the book whether they know how to program in Basic or not. All programs are written in a restricted subset of standard Basic and should be compatible with many versions of that language currently available to microcomputer users, a spokesman explained.

Options are included with some programs to allow the user to change the input or output format of the original program, he said.

The book consists of 76 programs and is available for $7.50 from Osborne at P.O. Box 2036, Berkeley, Calif. 94702.

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Board Bows

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. has introduced a board with 1K byte of on-board random-access memory (RAM) and a capacity for up to 12K bytes of 2708-type erasable programmable read-only memory (Eprom).

The board occupies two independently addressable 8K-byte blocks and complete addressing flexibility is provided to conform to any system configuration with a minimum of address jumpers required, a spokesman claimed. Video boards or disk operating systems can be nested in the 3K bytes of unused space, he added.

The board costs $135 in kit form and $175 assembled from the firm at 790 Hampshire Road, A-B, Westlake Village, Calif. 91361.

Tele Speed Has Serial Printer

SYOSSET, N.Y. — Tele Speed Communications, Inc. here has introduced a dot matrix serial impact printer for the microcomputer hobbyist.

The Model 81 printer is an 80 char./sec, 80-column, bidirectional asynchronous printer. It comes complete with electronics, power supply and cabinet. The printing medium is friction-fed pressure-sensitive paper.

The unit's paper advance and carriage are stepper-motor driven, permitting the unit to be used for graphics or as a plotter, the spokesman added.

The printer with parallel Ascii interface costs $615 and deliveries will begin in December, the spokesman said. Tele Speed can be reached at P.O. Box 647, Syosset, N.Y. 11791.

Development Support Offered

CUPERTINO, Calif. — Zilog, Inc. has introduced a program development system, the Z80-PDS, to provide support for developing and debugging Z80-based mirocomputer programs.

The standard Z80-PDS includes a floppy disk drive with up to 300,000 bytes of on-line data storage, internal memory consisting of 3K bytes of programmable read-only memory and 16K bytes of random-access memory and serial I/O with RS-232 or strapable current loop interface, according to a spokesman.

System Expandable

The system is expandable to provide additional I/O or terminal capability and can also be used as a general-purpose microcomputer.

The serial I/O feature allows the use of CRTs or hard-copy devices with rates from 110 bit/sec to 19.2 kbit/sec.

Software for the system includes a disk-resident operating system, editor, assembler, debugger and file handling utilities.

The system costs $2,850 from Zilog at 10460 Bubb Road, Cupertino, Calif. 95014.

Gnat Introduces Micro Compiler

SAN DIEGO, Calif. — Gnat Computers, Inc. has introduced a Fortran compiler for its Minifloppy/Microcomputer system.

The compiler includes all Ansi-standard Fortran, X3.9-1966, except for double-precision and complex numbers, which will be available at a later date, a spokesman claiemd. In addition to the compiler, a relocating assembler, a linking loader and Fortran library are included. Fortran function are implemented with 32-bit floating-point arithmetic and integers are implemented with 16 bit numbers, the spokesman explained.

The Fortran can be purchased for $500, which includes a single copy and documentation. Gnat is at 7895 Convoy Court, Unit 6, San Diego, Calif. 92111.

Builder Shares Kit Experiences

(Continued from Page 55)

Prom resident monitor with device independence, program relocatability, spooling and procedure library is also in development. After these projects are complete, I plan to develop a linking loader, sort/merge and commercial Fortran compiler.

Incidentally, for the privilege of being a Canadian, I have to spend about one-third more than an American for the same product. Of the $6,000 I have spent so far, about $1,500 has gone directly to the Canadian government in customs duties and taxes. Say, for example, I buy a memory board for $100. The exchange rate costs me $8, shipping $4, and customs, which is 10% and is figured on cost and exchange, will run $11. Finally, a 12% federal sales tax — which is figured on cost, exchange and duty— will run $14 for a total of $137 for the $100 board.

One of the most important things I have learned through all of this is that there are many "hidden gotchas" to look out for in hobbyists kits.

Anderson is a hobbyist in Ottawa, Ontario.

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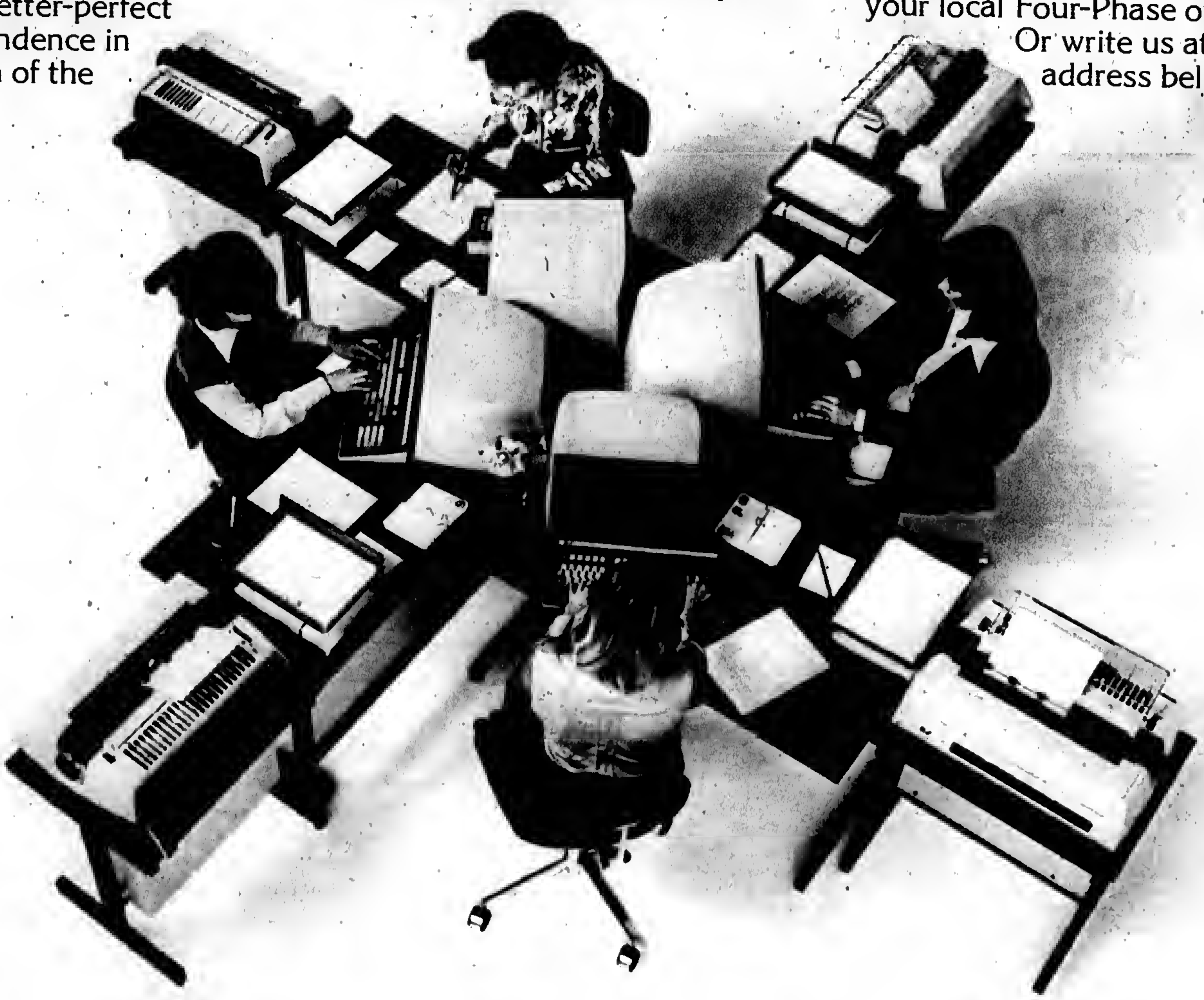

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Processor Technology SOL-20 for sale. $1,000. Includes 16K memory. Reply Michael Jones, 110 Twinbrook Perrysburg, Ohio 43551.

FOR SALE: HP9830A. Call (312) 432-2998.

Unit Programs Eprom Chip

DERBY, Conn. – A programmer for the 1702A erasable programmable read-only memory (Eprom) chip has been introduced by E&L Instruments, Inc. as an accessory to the firm's MMD-1 microcomputer.

By sharing MMD-1 circuitry, the device can be used to program a 2K-bit Eprom chip in about four minutes, a spokesman claimed.

A 1702A Eprom chip installed in the programmer will accept data from any block of MMD-1 memory as well as from any chip designated as a master to be copied. After programming, the Eprom's contents can be verified.

Data transfer between the programmer and MMD-1 takes place over a 40-pin connector and ribbon cable assembly. The unit costs $222 assembled and $166 in kit form from E&L at 61 First St., Derby, Conn. 06418.

The Eprom programmer is an accessory to the MMD-1 microcomputer.

Hobby Havens

As a service to hobbyist readers, Computerworld *periodically will list the micro clubs in different parts of the country. Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at* Computerworld, *797 Washington St., Newton, Mass. 02160.*

ARIZONA

Arizona Computer Society. Contact: Jim Schaefer, P.O. Box 14391, Phoenix, Ariz. 85063. Telephone (602) 846-0709.

FLORIDA

Space Coast Microcomputer Club. Contact: Ray O. Lockwood, 315 Inlet Ave., Merritt Island, Fla. 32952. Telephone (305) 452-2159.

MINNESOTA

Minnesota Computer Society. Contact: Jean Rice, P.O. Box 35317, Minneapolis, Minn. 55435.

Southeast Minnesota Amateur Computer Society. Contact: J. Michael Anglin, 6912 N.W. 18th Ave., Rochester, Minn. 55901. Telephone (507) 282-9748.

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As Market Soars

Bubble Memory Prices to Drop: Study

By Toni Wiseman
CW Staff

SAN JOSE, Calif. — Bubble memory components for small systems will sell for 6 millicents per bit in 1981, a year in which the market will total $180 million.

That same year, bubble memory components for disk replacement will sell for 3.6 millicents per bit with a market totaling $72 million, according to a recent report by Small Business Systems.

The study made several dramatic statements on the market impact of bubbles. For instance:

- "The gap filler or Fast Access Memory (FAM) role will be taken by charge-coupled devices (CCD). Little effort will be made to improve bubble memory shift rates.
- "Bubble memory chip capacity will exceed random-access memory (RAM) chip capacity by an average factor of better than 10 to 1 between 1977 and 1981.
- "IBM will announce bubble memories in a product before 1980. The system will be configured to discourage attachment of non-IBM peripheral memory devices."

Small Business Systems noted that bubble memory is similar to semiconductor technology in that Bell Laboratories controls many of the patents.

"Bell has taken a stance in bubble memory technology similar to that in semiconductor technology: Licenses are available at a relatively modest fee plus royalty. This means that no company will be able to become dominant through its patent position; this should ensure a competitive market for some years to come," the report suggested.

Entry into the bubble memory market is an expensive proposition at this point in time since there is little equipment which uses the technology and therefore no significant sales volume. Small Business Systems estimated that a new component manufacturer would have to announce its product and then wait between 18 months and two years for volume usage to begin, all the while bearing the high fixed cost of bubble memory manufacturing operations.

Once the market develops, however, the firm estimated that the necessary $1.8 million capital expenditure for a bubble memory line will be less than that required for a new semiconductor line, marking it appear attractive to a component supplier.

Market Forecasts

"The rate of growth of bubble memory sales is limited by two factors: the design time required to bring products using bubble memories to market and the ability of manufacturers to expand their capacity to meet demand," the report stated.

While an 18-month "dry" period between the introduction of a component and its first volume sales can normally be sustained by manufacturers because the capacity of their production lines is absorbed by more mature products, bubble memory lines make only bubble memories. This means the capacity of the production line is unabsorbed and it is likely the first manufacturers to announce products will sustain heavy losses until sales build up, it said.

Despite this fact, Small Business Systems forecast new suppliers will enter the market by 1979 or 1980, joining Texas Instruments and Rockwell — the only current suppliers.

The study predicted two significant events will occur in the 1979-80 timeframe; the entry of new suppliers will make prices more competitive and the lower prices and higher industry capacity will cause bubble memory suppliers to seek to enter the disk replacement market.

The estimated 1977 U.S. memory market will be dominated by RAM memories (60%), followed by disk drives (26%), tape drives (6%), FAM (4%), floppy disk drives (3%) and mass storage (1%), according to Small Business Systems' figures.

The size of the RAM market has always attracted the semiconductor industry, whose constantly growing productive capacity demands a very large market. Small Business Systems expects the same scenario will be repeated in the disk market and, while bubbles are not semiconductors, fabrication techniques are similar and should not be difficult for a semiconductor firm to master.

IBM Entry

"In addition, the projected entry of IBM should legitimize the application. IBM may well introduce bubble memories in a new system in such a way that it is impossible for add-on memory suppliers to duplicate the memory without access to bubble technology.

"This would cause these suppliers to seek access to the technology and create an IBM-compatible bubble memory market similar to the present add-on memory markets. This, in turn, would stimulate the merchant market for bubble memories," the report said.

The small system bubble memory market should grow from 12,000 units in 1977 to 1.2 million in 1979 and 3 million in 1981. Bubble sales during that time will rise from $4.8 million in 1977 to $92.4 million in 1979 and $180 million in 1981, it added.

The report — *Bubble Memory — Impact and Opportunity* — is available from Small Business Systems at Suite 230, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Five Years, 40 Members Later, CCIA's Influence Still Growing

By Edith Holmes
CW Staff

WASHINGTON, D.C. — It all began with an association with a one-year charter whose "whole purpose was to get U.S. vs. IBM off the dime."

Today, five years later, the Computer and Communications Industry Association (CCIA) aspires to be the spokesman for these industries in a broad range of issue areas.

The membership push is on. "We must double our membership" if the association is to meet the expenses of covering the capital formation, standards and competition issues it sees in the computer and communications industries, according to A.G.W. (Jack) Biddle, the CCIA's president.

During the meeting of its member companies' executive officers in Chicago in August (CW, Aug. 29), the CCIA formally established a new category of membership: associate member, which is open to user organizations and to institutions — such as banks and investment firms — that are concerned about the future, Biddle said.

The CCIA hopes its drive will attract between 50 and 60 companies — yielding about a one-to-one correspondence with its corporate membership of 40 firms. The association expects to attract the more sophisticated users, the multivendor shops.

"It behooves the user, particularly the sophisticated user with a million-dollar DP bill and a million-dollar phone bill, to come forward and be active in the issues facing these industries," Biddle stated.

Interest Aroused

Long a proponent of user involvement in DP, and more recently in the communications scene, the association conceived of its new membership category in the wake of IBM's 3033 system announcement. Eleven companies, all with over $200 million in annual revenues, called the CCIA to express concern over IBM's plans and to express interest in the association, Biddle said.

Five years ago, in Encino, Calif. seven beleaguered plug-compatible peripheral manufacturers (PCMs) banned together un-

(Continued on Page 60)

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Five-Year-Old CCIA Gaining in Influence

(Continued from Page 59)

der the title "Computer Industry Association" (CIA) to blunt the battering they were taking from IBM through leasing plans, tape drives and disk drives.

Early on, however, the association realized if it was to speak for the industry, it had to broaden its interests and understanding beyond that of the PCMs, Biddle noted.

By that time, though, the anti-IBM image had already been created. The anti-AT&T image quickly followed. From the viewpoints of those giant corporations, the association might as well have been the federal CIA.

Biddle maintains that today's CCIA is a different organization from the fledgling band of five years ago, with a different member complexion, a different leadership.

"Monitoring and affecting the competitive structure of the industry is still considered the highest priority of the association by its member companies," Biddle added.

But CCIA notions of just how that competitive structure is to be achieved have mellowed and matured.

Broad Membership

The Association's membership is sufficiently broad — including Amdahl and Itel, software firms, all forms of peripherals companies, terminal makers and third-party leasing outfits — and its stance on issues is consiliatory enough that it can join with either IBM or AT&T to urge a more competitive industry structure.

The CCIA cooperated with IBM in filings before the FCC concerning AT&T's Dataspeed 40/4 offering and the second Computer Inquiry, and the association aligned itself with AT&T concerning IBM's Satellite Business System venture.

Perhaps the CCIA has learned that antitrust suits don't provide the only means available to make an industry more competitive.

"The computer industry is 30 years old. For almost 20 years, there has been litigation pending against IBM. We have to stop that because it affects everybody, including IBM and users," Biddle said.

A.G.W. (Jack) Biddle

Certainly, the progress toward relief achieved thus far in both U.S. vs. IBM and U.S. vs AT&T has shown that there must be other avenues leading to more open markets, Biddle suggested.

Beyond the court cases, however, the association firmly believes that the computer and communications industry and its marriage with communications intensify "the situation of the nation as a whole" in that these fields are capital intensive, Biddle said.

Capital Formation

Capital formation is a key, crucial issue and one that must be resolved soon if the computer and communications industries in particular and the nation as a whole are to continue to raise new entrepreneurs, the CCIA president added.

The issues the association hopes one day to represent rapidly become global problems driven, chiefly, by the rising cost of energy, Biddle suggested. The CCIA's concern for the recreation of the competitive structure of the economy has led to its worry that small and medium-sized businesses are not sufficiently represented before the federal government.

The CCIA would like to work more closely with organizations like the National Small Business Association, but a lack of manpower makes working with others difficult, Biddle said.

Again, membership is crucial. In this area, as in the fields of interest to users, investment firms and the specialized common carriers, the CCIA plans to increase its current staff of 12 people. It will add at least one person per interest area to take care of the needs of each of these groups as soon as they join the association in sufficient numbers to provide the necessary funding, the CCIA president said.

The CCIA stands the best chance of representing the entire industry because it opens its membership to all segments of the industry, unlike the other two computer and communications industry representatives in the nation's capital — the Computer Business Equipment Manufacturers Association (Cbema) and the Association of Data Processing Service Organizations (Adapso), Biddle said.

But can the CCIA represent the computer and communications industries without IBM, "the seven dwarfs," AT&T and the other carriers? No, not the entire industry, Biddle said.

Maybe the threat of government regulation of the computer industry would bring IBM closer to the association. Maybe it is currently in the CCIA's interest not to have AT&T and IBM as members, equal though all the association's members might be. Maybe in five more years . . .

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Trial Documents

Foreign Share to Drop 8%

ADL Sees U.S. Losing Edge in World Market

By Molly Upton
CW Staff

NEW YORK — By 1981 the installed value of the non-U.S. computer base could exceed that of the U.S., according to a five-year forecast from Arthur D. Little, Inc. (ADL) that was entered into evidence in the U.S. vs. IBM antitrust trial here.

The rest of the world could contain 52% of the world total installed base of general-purpose computers by that year, ADL said in its study on "The World Computer Industry 1976-1981."

At the end of 1976, nearly 47% or $40.9 billion of equipment was located outside the U.S. The value of general-purpose computers worldwide was $87.4 billion, the report indicated.

By 1981, the non-U.S. installed base will be about $78 billion, or 52% of the world total of between $140 and $155 billion, according to ADL. This represents an increase in value of over 90% during the next five years.

U.S. manufacturers' share of the foreign market should drop from 71% to 63% by 1981, although the value will grow from $29.3 billion to $49.2 billion, up 68%, the report indicated.

The principal reason for the reduction will be the increasing nationalistic efforts by local governments, although the difficulty in distinguishing between U.S.-affiliated and foreign firms because of international combinations will also be a factor, the research firm said.

ADL estimated a 9% annual growth rate for the U.S. installed base and an annual 12% abroad, assuming an average real gross national product growth rate of 3% annually for Western Europe and 5% for Japan in the 1976-1981 period.

Looking at various regions, ADL said U.S. makers should increase their base in Canada from $2.3 billion in 1976 to between $3.8 billion and $5 billion in 1981.

The U.S. portion of the Western Europe base should grow from $21.2 billion to between $30 billion and $38 billion while Eastern Europe should jump from $.2 billion ~~to b~~etween $.6 billion and $.8 billion during that same time frame, the report continued.

The U.S. piece of the Japanese pie will grow from about $2 billion to between $3.2 billion and $4.8 billion, the report added.

The only region in which the U.S. share is supposed to increase is Eastern Europe, where the base should include 10% from U.S. shipments, up from the 5% in 1976.

The total base there should grow from $3.3 billion in 1976, to either $5.5 billion or $7.5 billion in 1981.

ADL expects more countries to concentrate on developing minicomputers rather than larger systems.

In Western Europe, the value of computer systems installed is expected to rise 50% to 90% to the $37 billion to $47 billion range by the end of 1981, ADL forecast. The wide range reflects the uncertain economic situation and its dependence on exports and petroleum imports.

During 1976, general-purpose computer systems in use in Western Europe increased in value by 15% to $24.6 billion, the report observed.

The U.S. share of the Western European market should decline from about 86% to 81% in 1981, principally because of "stronger participation of indigenous manufacturers in the fields of minicomputers and small business systems," it said.

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	San Francisco	Los Angeles	Cleveland	Minn/ St. Paul	Chicago	New York	Philadelphia	Washington D.C.	Boston	Total
Corporate Officers	784	962	442	284	849	1,172	458	333	671	5,955
Systems Mgrs & Operation Mgrs	1,619	1,665	1,115	944	1,995	2,403	1,131	1,009	1,182	13,063
Programmers & Analysts	998	1,138	662	688	1,381	1,338	729	532	712	8,178
Engineering Mgt & Engineers	709	847	380	309	727	662	307	255	641	4,837
Sales & Marketing Personnel	353	371	241	215	385	592	204	187	410	2,958
Consultants/Accountants	299	293	133	115	381	576	190	151	381	2,519
Librarians/Educators/Students	209	311	192	157	207	264	127	98	121	1,686
Others	370	411	279	265	471	445	249	225	267	2,982
Total	5,341	5,998	3,444	2,977	8,398	7,452	3,395	2,790	4,385	42,178

Attendance by Industry Classification

	San Francisco	Los Angeles	Cleveland	Minn/ St. Paul	Chicago	New York	Philadelphia	Washington D.C.	Boston	Total
Computer Manufacturing or DP Hardware/Peripherals	976	1,132	488	536	658	902	249	143	823	5,905
Manufacturer (Other)	551	912	789	546	1,480	1,039	648	130	736	6,833
Serv Bur/Sftwr/Plnng/Consult	710	978	390	255	745	1,049	506	375	558	5,566
Pub Util/Comm Sys/Trans	355	244	248	217	418	599	240	137	199	2,857
Wholesale/Retail Trade	310	288	191	227	410	472	154	99	253	2,404
Finance/Insurance/Real Estate	594	576	338	266	813	1,055	482	384	344	4,850
Mining/Const/Petroleum/Ref	105	104	68	26	119	87	59	30	119	717
Business Service (Except DP)	143	141	78	57	218	271	104	47	166	1,223
Education/Medicine/Law	478	568	305	340	595	[illegible]	379	260	405	4,133
Government-Fed/State/Local	693	541	262	206	384	288	280	902	275	3,831
Prntg/Publish/Other Comm Serv	101	139	67	115	187	340	120	97	184	1,350
Others	325	375	224	184	371	547	174	188	323	2,709
Total	5,341	5,998	3,444	2,977	8,398	7,452	3,395	2,790	4,385	42,178

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Hewlett Explains Fundamentals of 'HP Way'

By Molly Upton
CW Staff

PALO ALTO, Calif. - What is the "HP way?"

"I feel that in general terms it is the policies and actions that flow from the belief that men and women want to do a good job, a creative job, and that if they are provided with the proper environment they will do so," according to Bill Hewlett, Hewlett-Packard Co. president.

"But that's only part of it. Closely coupled with this is the HP tradition of treating each individual with consideration and respect and recognizing personal achievements," Hewlett observed in the firm's publication *Measure*, which was devoted to looking at how employees and officers explained the firm's philosophy.

Although Hewlett admitted this sounds "almost trite," he said he and cofounder Dave Packard have tried to operate the company along these lines since it first started.

In line with this confidence in, and concern for, people, the founders decided the firm should not be a "hire and fire" operation, he said.

"Perhaps the company's most important responsibility to its people is providing stability of employment."

In at least two instances, rather than cut the workforce, HP has shared the burden of a recession or imbalance of orders and production by reducing work hours and pay for those affected. The net effect is that the firm emerges fully staffed with capable people who have confidence in the company, according to the publication.

One corollary to the HP way is that "employees should be in a position to benefit directly from the success of the organization," he continued. HP developed a profit-sharing plan and an employee stock purchase plan, as well as medical insurance for catastrophic illness.

Each foreign country organization tailors its benefits to its own traditions, laws and values.

In the U.S., employees with more than six months of service are eligible to participate in the profit-sharing plan, which is calculated on HP's pre-tax earnings.

The U.S. stock option plan permits employees with at least one year of service to set aside up to 10% of base earnings to buy shares, which are issued quarterly at current market price. HP contributes 25% of the cost of the stock, Hewlett said.

Small Divisions

HP's policy of keeping basic business units, the operating divisions, small and well defined is designed to "give people a clear sense of their own mission and an awareness of their individual contributions to overall performance," he continued.

HP believes in developing its own management and has applied its own concept of management by objective.

"When stripped down to its barest fundamentals, management by objective says that a manager, a supervisor, a foreman given the proper support and guidance (that is, the objectives) is probably better able to make decisions about the problems with which he is directly concerned than some executive way up the line — no matter how smart or able that executive may be.

"This system places great responsibility on the individual concerned, but it also makes his work more interesting and more challenging," Hewlett said.

"It makes him feel he is really part of the company, and that he can have a direct effect on its performance," he continued.

The firm has a wide variety of company-sponsored training and development programs including apprenticeship programs combining on-the-job training and classroom instruction.

It also offers televised courses from universities in which the remote classrooms are equipped with audio communications to the instructors.

Individual's Worth

Stressing the importance of the dignity and worth of the individual, HP long ago eliminated time clocks and more recently introduced flexible work hours.

"This is meant to be an expression of trust and confidence in HP people as well as providing them with an opportunity to adjust their work schedules to their personal lives," Hewlett remarked.

The firm operates with an informal and personal atmosphere. Hewlett hopes it can retain this "'family' way of operating with a minimum of controls and the maximum of a friendly 'help each other' attitude."

"You can't describe it [the HP way] in numbers and statistics. In the last analysis, it is a spirit, a point of view. It is a feeling that everyone is a part of a team, and that team is HP . . . It is an idea that is based on the individual.

"It exists because people have seen that it works, and they believe in it and support it. I believe this feeling makes HP what it is and that it is worth perpetuating,'" Hewlett said.

List of Concepts

A 1975 management meeting produced the following list of concepts embodied in the HP way:

- Belief in people; freedom.
- Respect and dignity; individual self-esteem.
- Recognition; sense of achievement; participation.
- Security; permanence; development of people.
- Insurance; personal worry protection.
- Share benefits and responsibility; help each other.
- Management by objective (MBO); decentralization.
- Informality; first name; open communication.
- A chance to learn by making mistakes.
- Training and education; counseling.
- Performance and enthusiasm.

Tran, SDC Plan Project

EL SEGUNDO, Calif. — Computer Transmission Corp. (Tran) and System Development Corp. (SDC) have agreed to combine their capabilities in a product development and manufacturing effort aimed at the commercial market sector in data processing and data communications.

The agreement includes a "significant financial investment" in Tran by SDC, making it a minority shareholder in Tran, according to Tran president Ray Sanders.

Along with the sharing of resources and techniques by the two companies, Tran will undertake the manufacture of products designed by SDC, as well as products resulting from cooperative efforts.

Details of the agreement were not disclosed.

Timetable Set

Diablo Systems, Inc. has established the production timetable for its Series 400 family of disk drives. The Models 411T (26.6M bytes) and 413T (53.3M bytes) will be available in October 1977.

Models 410T/F (13.3M bytes), 411F (26.6M bytes), 412T/F (40M bytes) and 413F (53.3M bytes) will be shipped in October 1978.

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Result of U.S. Recession

Data 100 Happy With Move to Expand Abroad

By Nancy French
CW Staff

MINNEAPOLIS — Data 100 Corp., a company that provides computer terminal systems for a wide variety of distributed data processing applications, has what many consider to be an unusually far-flung international operation for an organization of its size.

Not too long after Data 100's December 1968 founding, a recession hit the U.S. When that happened, the firm's founders were quick to see the advantages of becoming an international operation since, at that time, European countries were "out of phase" with the U.S. and business was still good there. As a result, in 1971 the company established its first fully owned subsidiary in the UK, according to William J. Bryant, staff manager for international business.

Today, six years and 13 wholly owned subsidiaries later, Data 100 doesn't regret the move, Bryant said in a recent interview.

The Minneapolis-based firm designs, manufactures, sells, leases and services products that are compatible with those of the major mainframers and intended for use at remote locations. The original products were oriented toward batch work — as well as interactive terminal systems.

It also produces minicomputer products, line printers and disk drives that it markets to other equipment manufacturers.

Its customers include large corporations, service bureaus, universities, financial institutions and government agencies in 22 countries, Bryant said.

Seventy percent of these customers use the firm's products in conjunction with a large IBM mainframe as the host computer, he said. The rest of the customers link Data 100 equipment to CPUs manufactured by Control Data Corp., Univac, Honeywell Information Systems and, in the UK, ICL, he noted.

Ambitious Growth

Having 13 wholly owned subsidiaries in Western Europe, a joint venture in Japan and distributor relationships in 15 other nations would be considered rather ambitious for a company the size of Data 100, a firm whose revenues in 1976 reached only $122 million.

Bryant explains it by saying, "Our compelling reason for expanding so quickly overseas is that 50% of the potential business for an American-based computer or peripherals company is outside the U.S. — especially for a firm like Data 100, whose customers are largely multinational corporations.

Data 100 took the route of wholly owned subsidiaries because it allowed the firm to give "better service to its customers," Bryant said.

Despite its 1,704-strong customer base, the company faces the need to raise capital constantly. Like most of IBM's competitors, Data 100 must lease 95% of its equipment rather than sell it outright.

Only last month, the firm raised $15 million in convertible subordinated debentures, Bryant noted.

But the future is bright, he said. Rather than replacing their large 370 mainframes with larger systems or by configuring them into dual processors, many users have begun to add functions remotely, using their 370s as hosts to a number of remote smart terminals with a controller or entire minicomputer systems. This trend bodes well for companies like Data 100.

"Customers are looking for additional functions and ways to do some processing out in the field — the local payroll, for example," he said.

Higher Level Languages

By using a higher level language with their terminal systems, users can run them as minicomputers, he said. Right now, Data 100 offers RPG on its tape-based Model 78 terminals. The next step is a disk-based model, followed by a product with a small data base capability, he said. The next language offering, of course, would be Cobol, but "that hasn't been introduced yet."

The firm's 80 series, the first part of which was announced earlier this year, will have more models with more capabilities announced throughout 1978, he said.

The 80 is advertised as a "multifunctioned series with all terminal functions plus processing. Voila, a stand-alone minicomputer system." But Bryant argues that Data 100, with its terminal controllers, has been in the minicomputer business all along. "We just didn't call it that."

And Bryant is also bullish about the firm's viability in the IBM world.

"Even if IBM changed its operating systems or interfaces, it wouldn't effect us directly," Bryant said.

"We're insulated by the telephone line, which is not in the hands of IBM," he said. Even if IBM's Synchronous Data Link Control (SDLC) becomes the de facto communications protocol, and that's likely to happen, according to Bryant, he feels it will replace the older well-established binary synchronous communications (BSC) protocol very slowly because users have spent years developing their BSC-type networks.

A.B. Dick Files Suits Against REI

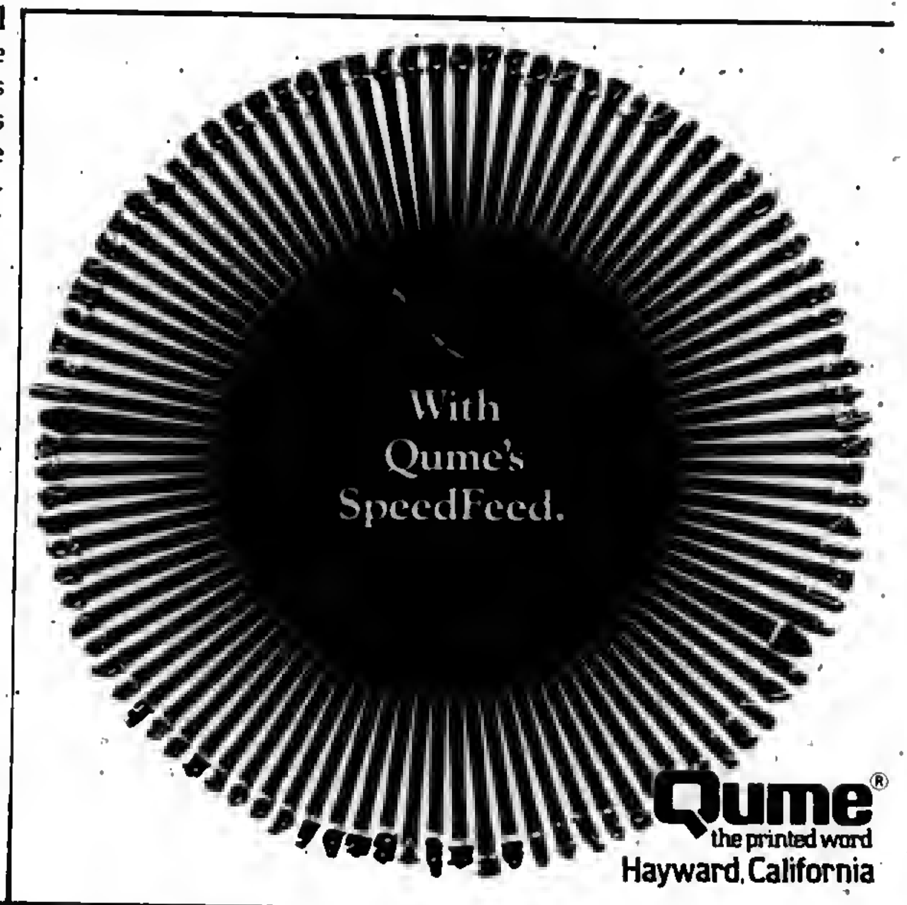
DALLAS — Recognition Equipment, Inc. (REI) has been named defendant in two lawsuits filed last week in Chicago by A.B. Dick Co.

The first suit, filed in the Circuit Court of Cook County, Illinois, alleges that royalties being paid to A.B. Dick by REI under an existing licensing agreement relating to an ink-jet printer patent are lower than required under the agreement. In the suit, A.B. Dick seeks to recover an unspecified amount for the alleged underpayments.

The second suit, filed in the U.S. District Court for the Northern District of Illinois, Eastern Div., alleges that REI, in the manufacture, use and sale of ink-jet printers, is infringing another patent under which A.B. Dick in the exclusive licensee.

A.B. Dick had previously offered REI a license under this patent. In this suit, A.B. Dick seeks to recover monetary damages of an unspecified amount and seeks an injunction against further infringement.

In responding to the two lawsuits, REI denied that A.B. Dick is entitled to recovery or relief under either of the suits and intends to oppose vigorously the claims made in both actions.



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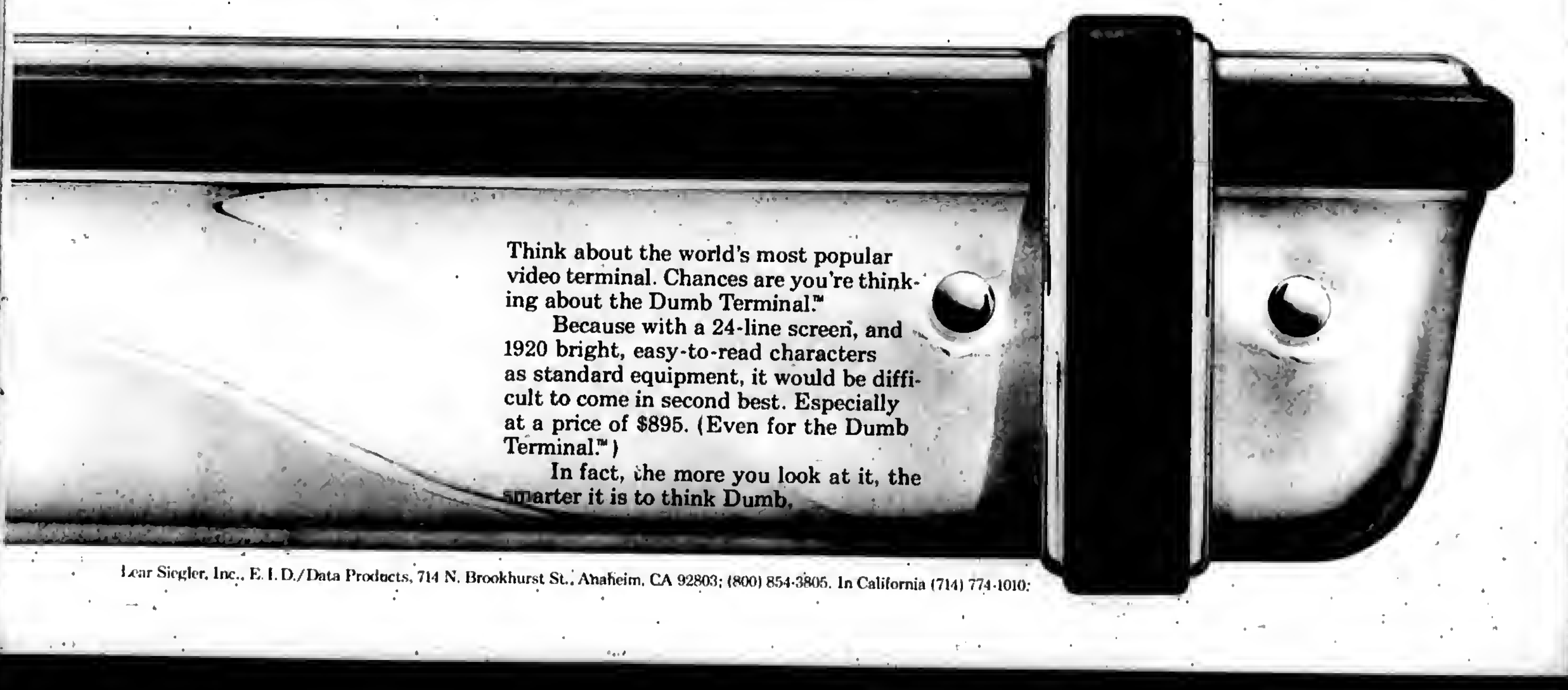

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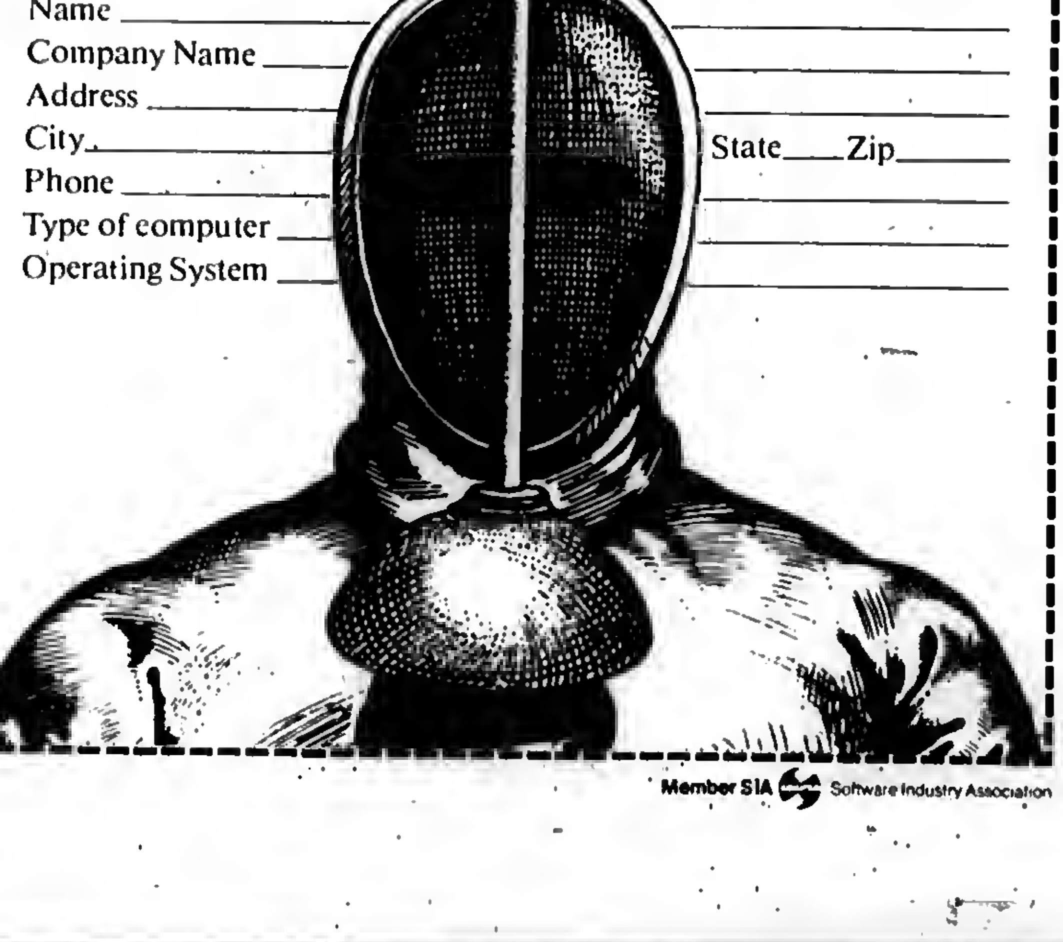

1976 Trade Results Mixed For Electronics Products

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Foreign trade in high technology, electronics-oriented products showed mixed results in 1976, according to the department of Commerce's International Business Administration.

Computer and communications products were among the five industry groups registering some increase in their trade balances; calculator shipments were among the three industry areas experiencing a decline.

The net result of these cross-currents in the trade of electronics products was a deterioration in the overall trade surplus of these goods to $876 million in 1976 compared with with $2.2 billion in 1975, the Commerce Department said.

Total exports rose 19% above the 1975 level to $8 billion, while imports rose 57% to $7.2 billion.

Exports of most industry group products increased in 1976. Exports of computers and related equipment rose 16% to $2.6 billion; telephone and telegraph equipment was up 15% to $227 million; and electronic components rose 27% to $2.5 billion.

Mirroring exports, nearly all import categories experienced increases last year. Imports of computers and related equipment rose 82% to $235 million; telephone and telegraph equipment was up 8% to $100 million; and electronic components rose 39% to $1.6 billion.

Only imports of calculating and accounting machines declined dropping less than 1% to $335 million. This decline was attributable to price erosion, Commerce stated.

BCC Sees Strong Growth For Xerographic Printers

STAMFORD, Conn. — There will be a substantial market for xerographic printers if IBM adopts them as the standard printer in the late 1970s or early '80s, according to Business Communications Co., Inc. (BCC).

Currently, there are over 80,000 impact line printers throughout the U.S. By 1985, over 120,000 line (or page) printers will service 59,700 computers, BCC estimated, noting that 23,000 of these will be xerographic printers.

While this is only 19% of the total, it represents a tenfold growth in eight years, BCC pointed out in a recent report on high-speed printing.

Computer output microfilm (COM) is also an attractive concept, it noted, adding that since 1973 COM sales have increased 30% annually because of the increased costs of paper. But COM faces many objections, most psychological, which will ultimately limit the field, BCC suggested.

"COM usage will continue to grow, and this presents an excellent opportunity for service bureaus, but this growth simply doesn't translate into equipment sales," the report said.

Finally, plotters present a stable market, though one dominated by California Computer Products, Inc. BCC said.

Companies have tremendous excess capacity for plotting. Therefore, growth can come from new or better equipment, such as the electrostatic plotter, and new uses, such as business graphics, it stated.

BCC estimated that 23,200 xerographic printers will be installed by 1985 — 8,800 with small computers, 6,000 with medium-sized systems and 8,400 with large computers.

By the same year, 4,783 COM recorders, 4,135 COM processors and 6,780 COM duplicators will be in use.

The largest base, however, will be plotters, with 1,689 flatbed plotters and 24,000 drum and electrostatic plotters installed by 1985.

A complete report is available from BCC at P.O. Box 2070C, 9 Viaduct Road, Stamford, Conn. 06906.

Expansions

Dataflux Corp. will move to 1050 Stewart Drive, Sunnyvale, Calif., where new facilities will provide a 50% increase in manufacturing and office space.

Pertec Computer Corp. will begin production at a 100,000 sq-ft manufacturing and support group facility in Chatsworth, Calif. The facility will accommodate all of Pertec's hard disk product line under one roof.

Digital Equipment Corp. has announced an agreement with the city of Boston to be the first tenant in the new CrossTown Industrial Park in the South End and Roxbury. DEC will occupy a 50,000 sq-ft facility.

Perkin-Elmer Data Systems' Terminals Division has doubled the size of its production facilities in Randolph, N.J.

Interactive Data Corp. of Waltham, Mass., has opened a 32,000 sq-ft computer center, doubling its time-sharing capacity.

Data General Corp. will add a 128,000 sq-ft plant to its Westbrook, Maine, facility.

General DataComm Industries, Inc. has purchased a manufacturing and headquarters facility in Danbury, Conn., including a 150,000 sq-ft complex.

Univac has purchased a 40-acre tract in the Oakmead Business and Industrial Park, Santa Clara, Calif., where it plans to build a development and manufacturing center. The initial phase will be a 400,000 sq-ft complex.

Persci, Inc. has moved its operations from Marina del Ray, Calif., to larger facilities at 12210 Nebraska Ave. in West Los Angeles.

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Removal of DP Duties Seen Boost to Canada

By Molly Upton
CW Staff

TORONTO – The removal of duty on computers by the Canadian government would give the industry here a real shot in the arm, according to Richard J. Ball, vice-president and general manager of Honeywell Information Systems, Canada.

On the average, a Canadian user pays 18% more for (imported) DP equipment than the U.S. user, he indicated. That's one reason why the small business market is not larger, he added.

Richard J. Ball

Ball said he thinks the government will remove the duty on DP products, thereby following a recommendation made three months ago by the nation's tariff board.

Rather than implementing a hardware manufacturing operation in Canada, HIS is concentrating on software and has several agreements with the University of Waterloo for software creation.

"Hardware manufacturing isn't a good charter for Canada because it is rapidly becoming low in labor intensity," he remarked.

Job Creation Emphasis

The emphasis in Canada is on job creation, he indicated, adding the government has become more interested in software development than hardware manufacturing in the past two years.

HIS Canada had its best year in history in both volume and profit in 1976 and at the recent end of the first half was 14% ahead of the 1976 period in volume, he said.

The Canadian market is about 10% of that in the U.S. but the complexion of the market is different, he added.

For example, 65% of the total industry revenues come from large-scale machines, compared with 45% to 48% in the U.S., Ball observed. Thus, the emphasis is on large-scale network-type systems, he said.

The figure for large-scale devices also includes related terminals and minis, but so far there are relatively few minis hooked into the large-scale systems, he indicated.

Much of Canadian business is based in one head office with branch plants scattered across the country, and banks are spread out coast to coast, he added.

For example, large banks have from 500 to 2,000 branches, so HIS Canada ran into the demand for large conventional network requirements as early as 1971, he said.

The next step is distributed networks, he added.

Buoyant Industry

Although the Canadian economy is down, with unemployment at 8.1% and the Candian dollar 93 cents on the U.S. dollar, the computer industry has been relatively buoyant, Ball said.

The industries aiding automation traditionally do better when the economy is down, he added.

However, he expressed concern that the Candian economy does not seem to be following its usual path of being 18 months behind the U.S. economy. It should be tracking upwards by now, he observed.

The economy in Ontario is pretty good, with 60% of the gross national product within 150 miles of Toronto, he noted.

Quebec accounts for 33% of the Canadian market and 35% of HIS' market, but Ball sees a lot of hesitancy there because of the bilingual issue. Many firms are reluctant to pour more investment into Quebec, he said.

Not only does HIS have a staffing problem in Quebec because of the languae requirements, but products such as GCOS operate in English and therefore are meeting reluctance. "You'd have to reinvent the product," he said, adding many other non-English-speaking parts of the world have accepted GCOS.

Foreign Orders & Installations

Computer Analysts and Programmers Ltd. of the United Kingdom has ordered an IBM Series/1 system.

Dai-ei Co., Ltd., a department store chain headquartered in Suita City, Osaka, Japan, has ordered a Honeywell Model 66/05 large-scale system.

Kaiser Resources Ltd. of Sparwood, British Columbia, a coal mining company, has ordered a Honeywell Model 66/05 large-scale system.

The Computer Communications Group of the TransCanada Telephone System has selected NCR Canada Ltd. to supply network interface machines for the Datapac network.

The Legal and General Assurance Society Ltd., an Australian insurance firm, has installed two NCR Criterion systems to help accommodate its growing volume of business.

Sky Line Cable Vision of Ottawa has ordered a Reality system from Microdata Corp.

Hacetepe University in Ankara, Turkey, has ordered a B6800 system from Burroughs Corp. to be installed in the new Beytepe campus now under construction.

Caja Rural Provincial de Huelva, a local savings bank in Huelva, Spain, has ordered a Univac 90/30 system.

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International News

Asian DP Has Healthy Year

By Toni Wiseman

©CW Staff

HONG KONG — This has been a landmark year for computing in Asia, with sales, installations and legislation all adding to the general air of well-being.

Hitachi Ltd., the second largest local computer manufacturer in Japan, signed an $8.5 million contract to supply three large computers to China — two Hitac M160 Series-II and a Hitac M170, according to the *Asian Computer Yearbook*. The computers will be used for weather forecasting and are scheduled for delivery early in 1978 to the Central Meteorological Bureau.

The sale, however, is still subject to approval by the Coordinating Committee for Trade of Strategic Goods with Communist Countries (Cocom), an agency of the Organization for Economic Cooperation and Development (OECD).

Meanwhile, communist bankers in Hong Kong are expected to decide this year on a computer system for 13 Peking-controlled banks in the British territory, the yearbook said.

"The People's Bank of China, with more than 500 branches throughout China, has been studying computerization for some time but has yet to make a move.

"Some members of the banking and computer communities believe banking authorities in Peking will use the installation in their Hong Kong banks as an experiment before deciding on a computer system for mainland banks," the yearbook suggested, noting that Control Data, IBM, Univac and NCR are thought to have the best chances of landing the contract.

While the banks are studying proposals, the Royal Hong Kong Jockey Club has made the largest computer purchase in Southeast Asia in recent years, selecting a system based on Digital Equipment Corp. hardware for its extensive betting system.

The system due to be installed for the opening of he club's new racetrack in October 1978, will be based on 14 PDP 11/70s and 11/05s and will have 600 terminals, located both on-course and in the club's off-course betting shops, the yearbook said.

"The system will be capable of handling 250 transactions a second, sufficient to accommodate the frenzied betting that takes place on horse racing in Hong Kong," it added.

Singapore's computer industry came of age in 1976 with SEARCC 76, the first Southeast Asian regional computer conference, organized by the Singapore Computer Society.

"There have been estimates that Singapore, like Hong Kong and other countries in the region, is currently running about seven or eight years behind developed countries in the West, but such estimates are challenged by some industry leaders who put he figure at closer to three years," the yearbook stated.

"Many people are confident Singapore eventually will emerge as the leading center for data processing in the South East Asian region, a position currently held by Hong Kong," it added.

India Delays Growth

Computer development in India is being carefully regulated by the government, with the twin aims of preventing a drain on foreign currency reserves and avoiding any loss of jobs, the yearbook indicated.

"The government has a policy of discouraging the use of computers for routine commercial functions, and it has placed an embargo on the import of hardware for such purposes," it said.

There are currently about 300 computers in India, with IBM having the largest share of the market. IBM was given notice early in 1976 that it must accept a local partner or be closed down, an ultimatum that IBM clearly found unsatisfactory, the yearbook noted.

"The Indian government's policy, expressed through the Electronics Commission, is to eliminate the import of minicomputers and to limit sales to locally produced units," it stated.

Finally, on the legislative front, the Hong Kong Computer Society has concluded a comprehensive investigation into the question of privacy and DP, resulting in a recommendation for legislation to protect individual privacy against the misuse of information stored in computer files.

"It has become clear . . . that reliance on such influences as professional codes of conduct to secure the basic human right of privacy will be misplaced. Legislation is the only answer, and has been found to be the only answer elsewhere," the Society said in its official viewpoint.

The Asian Computer Yearbook is available from Room 302, Ivy House, 20 Wyndham St., Central, Hong Kong.

Canadian DP Arena Detailed

OTTAWA — As of May 1, 1976 the installed base of computers in Canada renting for more than $1,000/mo totaled 5,937, according to a census taken by the Canadian Information Processing Society (Cips).

IBM had the largest market share with 1,645 systems, followed by Digital Equipment Corp. with 985, Honeywell with 532, NCR Canada with 448 and Univac with 402.

By province or territory, Ontario has the largest installed base, 2,714 systems, followed by Quebec with 1,350 and British Columbia with 621.

Almost half the sytems, 2,314, rent for $1,000 — to $1,999/mo. There are 1,924 systems renting for $2,000 to $4,999/mo and only 240 rent for $50,000 or more, Cips found.

Manufacturing is the largest user, accounting for 1,332 systems. Distribution (wholesale/retail) accounts for 714 computers while government uses 690 computers and service bureaus 586.

A complete census is available for $50 from Cips, Suite 214, 212 King Street West, Toronto, Ontario, M5H 1K5.

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Pertec: Plug-Compatible Floppies Developing

BOSTON — The flexible disk drive will be thought of more and more as a component by system designers.

And, in response, disk drive suppliers will strive for plug compatibility among competitive products, J. David Callan, vice-president and general manager of Pertec Computer Corp.'s Microsystems Division, told the Invitational Computer Conference here recently.

As an example, Callan pointed to Pertec's recent introduction of its FD200 Microfloppy disk drive for 5-1/4-in. diskettes, which is mechanically and functionally interchangeable with the Shugart SA400 introduced earlier.

"Performance and features differ," Callan said. "The FD200, for example, permits writing on 40 tracks vs. 35 for the SA400. But the signal interfaces are compatible and mounting holes and outline dimensions are the same.

"With two independent suppliers of floppy disks offering plug-compatible units, there will be a strong incentive for other manufacturers to follow suit," he stated.

The result of the trend toward plug compatibility will be that OEM system manufacturers can be much more comfortable about the availability of second-source suppliers and the ease of upgrading as new products are introduced, he explained.

Capacity Doubling

Callan also noted that the capacity of floppy disks has been doubling at two-year intervals — a growth rate that, coincidentally, parallels the increase in density of LSI memory chips.

"The doubling of storage capacity has come about through the successive introduction of double-sided recording and double-density coding schemes in floppy disk drives," Callan said. "The next jump in capacity is likely to come from double-track recording, which seems to be just about two years away."

Manufacturers are working on write precompensation schemes in the disk controller to implement double-track recording, Callan said. In addition, media improvements may become available to overcome some of the stability limitations of current mylar flexible disks.

Either of these developments, or a combination of the two, is likely to make double-track recording and the resultant doubling of disk capacity available to users within the two-year span, he said.

As for pricing trends, Callan said a round of competitive price cutting is likely to be over; and floppy disk prices will probably stabilize for some time to come.

He does, however, foresee the user benefiting in the near future from improved performance and added features without a significant cost increase. This will be achieved through improvements in the drive and through the availability of new LSI controller chips now being developed by semiconductor companies, Callan said.

Executive Corner

- Donald L. Gross has been elected chairman of the board and William R. Doniger has ben named president and chief executive officer of Mini-Computer Systems, Inc.
- Richard L. McCall, president of U.S. Datacorp, has been named to the Trade Member Council of the National Micrographics Association.
- Ronald E. Vance has become vice-president of Anacomp, Inc.
- William R. Kaseta has been appointed director of sales and marketing at Information Access Systems.
- James MacKenzie has joined Data Terminal Systems as director of marketing.
- Jesse W. Caravello, Martin Hoffman, Paul L. Jones, Michael E.McCorry and Donald J. Walker have been named vice-presidents of Comshare, Inc. They will head operations, research and development, financial product services, Western sales and Eastern sales, respectively.
- John E. Fox has become vice-president for marketing and Robert J. Perry has been appointed vice-president for plans and controls at Satellite Business Systems.
- Clyde J. Cook and William S. Ringler have been promoted to senior vice-presidents, and W. Chuck Kruger and Dennis Self have become vice-presidents of Central Computer Services, Inc.
- Richard L. Seaberg has been named vice-president and general manager and Wilfred D. Geiger has been appointed director of business planning for Univac's Defense Systems Division.
- Robert E. Didion has become division vice-president for operations and Bob C. Barron has been promoted to vice-president for industrial relations and administration at Pertec Computer Corp.
- Ronald G. Gilch has been appointed director of the business development department of Aspen Systems Corp., a subsidiary of American Can Co.
- John Russell has been named manager of marketing programs at Bowne Time Sharing.
- John Puchon has been appointed director of systems development for Decision Data Computer Corp.
- Fred J. Gentile has been appointed vice-president for development at Action Communications Systems.

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You have probably been following Amdahl's progress and have come to respect the company's technical, marketing and support capabilities. You may even know someone from Amdahl, and you are somewhat envious of his or her professional freedom and opportunities for advancement. And you may already be impressed with the enthusiasm and spirit of the challenge that seems to touch everyone at Amdahl.

There is still room on the ground floor at Amdahl. We are actively looking for candidates to fill the local positions in this advertisement. (We also have available openings on our headquarters support staff in California.) Please call 415/735-4308 (collect) for an advance appointment to talk in one of the cities shown below; ask for Phil Beckhelm. Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. We are, of course, an equal opportunity employer.

LOCAL INTERVIEWS FOR LOCAL AREA POSITIONS

Call Phil Beckhelm at 415/735-4308 (collect) for advance appointment, or contact him locally at the indicated hotel.

WASHINGTON, D.C.	NEW YORK CITY	DETROIT	MINNEAPOLIS
Capitol Hilton	New York Hilton	Sheraton Southfield	The Registry Hotel
Thurs., Fri., Sat.	Sun., Mon., Tues.	Thurs., Fri., Sat.	Sun., Mon., Tues.
Oct. 6, 7 & 8	Oct. 9, 10 & 11	Oct. 13, 14 & 15	Oct. 16, 17 & 18

FIELD SYSTEMS ENGINEERS

You will provide first-level systems software support at Amdahl 470 installations, assisting the center in maintaining systems software both within and without the Amdahl supported systems. You have large systems software experience with one or more of the following SCPs or program products: MVS, VM, SVS, VS1, ASP, JES2, JES3 or CSCP. You know internals and have defined and tuned SCPs. You also have exceptional diagnostic abilities, and are familiar with large systems hardware and peripherals as they interrelate with IBM compatible software. You have the personal skills to assume account management responsibilities.

FIELD ENGINEERS

You will provide first-level hardware support at Amdahl 470 installations, utilizing your initiative as well as your talents in aiding the center in overcoming all hardware problems regardless of their origin within the center. You will troubleshoot CPU and memory units, and act in an advisory capacity on non-Amdahl peripherals. In addition to performing all types of maintenance on 470s, you will coordinate Amdahl headquarters support staff in making installations. You have several years' large systems experience (preferably 370/158-168), or have worked as a peripherals field engineer in a large-system environment. You will enjoy some travel.

REGIONAL FIELD SYSTEMS ENGINEERS

You are a well-seasoned, large-scale systems programmer with the experience or aptitude for supervision and marketing support. You will perform survey and analysis work at prospective installations, provide technical assistance in proposal generation, and participate in marketing presentations. You will also be a strategy advisor to field systems engineers, aid in recruiting regional support personnel, make field support recommendations to headquarters, and bring your talent to bear on the more elusive software maintenance problems. The most immediate openings exist in Washington, D.C. and Detroit.

COMPUTER SYSTEMS SALES REPRESENTATIVE

You are the right candidate for this opportunity if you do not *have* to make a move; if you are currently leading your peers in competence, enthusiasm and performance, and if you have a need to be on a winning team selling the better product. You will have a thorough knowledge of the large-scale computer marketplace, and a five-year performance record. You will enjoy the personal and professional satisfaction of selling the proven price-performance leader, and enthusiastically relating the Amdahl success story to a wide audience that is anxious to hear the details. The most immediate opening is in our Eastern Division.

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1

ADVANCED TECHNICAL DIVERSIFICATION

2

PROFESSIONAL GROWTH

3

OUTSTANDING CAREER PACKAGE

Engineers – Software Design

3 Reasons Why You Should Look Into the Career Opportunities at GTE Automatic Electric!

Career challenge: the opportunity to make significant contributions at the beginning of a new era in a major industry.

The technical evolution in telecommunications is underway, We're working in many areas of software design in an on-line, real-time environment. Definition, design and implementation projects include CAD, Data Base Systems, Simulation, Fault Recovery, Diagnostics, and very complex switching networks using distributed control system technology. These are the forerunners of even more advanced systems that will be designed for the next generation.

SOFTWARE DESIGN

We're looking for an indepth background in the development of systems software and a minimum of 3 years' experience in structured design, testing and documentation of programs running on large data base, multi-file systems in real-time. Familiarity with HIPO design documentation, TSO usage and software simulation techniques as well as PL1, Fortran and assembler languages for the 8080 and PDP 11 programming is also important.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

COMPUTER AIDED DESIGN

We are looking for an extensive background in the design of CAD/CAM systems and the development of Interactive access by the users of CAD/CAM functions. Required is 5-10 years' experience in both hardware and software aspects; DA systems operations, and design, and systems engineering. Your initial responsibilities will include evaluation of existing systems, and working with a project team in the Architectural Planning of a major new system.

MINI-COMPUTER PROGRAMMERS

We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing mini-computers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

Call now and let us fill-in more details. . .

CALL (800) 323-1966

In Illinois call (800) 942-0491
Sunday thru Friday, from 8 am to 4 pm cdt

If you have current experience in one of these areas, a BS, MS or PhD In Electrical Engineering, Computer Sciences, Math, or other appropriate discipline, let us count out more of the benefits and challenges you receive as a member of the GTE family.

If unable to call, please send your resume to:
Manager of Technical Employment, Dept. 471 A6

GTE AUTOMATIC ELECTRIC LABORATORIES
400 N. Wolf Road
Northlake, Ill. 60164

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Field Engineering Specialists

Amdahl Corporation has earned an international reputation as builder of the most advanced large computer system. Since our first shipment two years ago, we have delivered a quarter of a billion dollars worth of computers to the world's major companies and institutions. The company is exciting, the environment stimulating, and our compensation and benefits are excellent.

We seek Field Engineering Specialists who have a minimum of 5 years' experience in maintaining large-scale systems with in-depth training on compatible CPUs. You will have company support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. You will have the opportunity to work with multiple customers, to guide and support field engineers and to use your technical expertise for your own personal development and the growth of the Amdahl Corporation. Openings exist at Amdahl headquarters in California and temporary assignments are available in the Far East with a permanent assignment following. Please indicate 580-E on your response and direct it to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

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COMPUTER SYSTEMS SPECIALISTS (DISTRIBUTED PROCESSING)

IT PAYS TO JOIN THE LEADER!

General Electric is the world leader in information services—time sharing, remote batch processing, networking. Now we're looking for aggressive Systems Specialists to help us grow in the area of distributed processing.

Major responsibilities for this position will include design and implementation of the software for an Intelligent Terminal Cluster in conjunction with our major time sharing network service. This includes assisting in the design of a Cluster Controller software system; implementation and coding of Cluster software; checkout of the implemented system; and software maintenance of the developed product.

Applicants must have programming skills in assembler languages, including at least four years experience with mini-computers and/or micro-processors, and experience in the design of data base and file structures for small size media such as floppy disks and cartridge disks. In addition, experience/knowledge in using and programming Intelligent Terminals (Datapoint, Sycor, Texas Instruments, Four Phase); distributed processing and distributed data bases; and communications protocols such as BYSNC, GRTS, SDLC, and X-25 is desired.

Send your resume, salary history and requirements in confidence to: J. Calhoun, Employment Manager, General Electric Company, Information Services Division, 401 N. Washington St., Rockville, Md. 20850.
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GENERAL ELECTRIC

THE SEARCH IS ON

For The Top Sales & Support People In The Computer Industry.

Marketing and Services Information Systems Division (MSISD)

has embarked on a major expansion program, sparked by both the outstanding success of our current state-of-the-art hardware and software systems and the promising new mini, small, medium and large computer systems going into production shortly. Honeywell MSISD is exploding throughout the country and seeks qualified professionals at all levels of experience to join them in the exciting computer future. Honeywell will be a major factor in this future. Talk to us and we will give you the hows and the whys as well as the whats about your future.

Hardware Marketing Representatives

Career and growth opportunities exist for sales/marketing representatives with experience in one or more of the following areas: LARGE SYSTEMS, MEDIUM SYSTEMS, SMALL SYSTEMS, MINI SYSTEMS AND PERIPHERALS. It will be your responsibility to develop and cultivate prospective clients and to ensure that all Honeywell marketing and service functions are coordinated to offer the most effective presentation of the company product lines. Expansion openings exist in major cities coast-to-coast.

Systems Representatives

This extremely important function involves planning, designing, developing and implementing systems applications and/or modifications to meet specific customer or prospective customer requirements. Career openings exist at all levels of experience from entry level with college degree or equivalent and at least one year programming background. Experience with languages such as: Fortran, Cobol, RPG-II, PL1 and Operating Systems, GCOS, and GMAP is desirable.

Field Engineering Representatives

At Honeywell, we seek Field Engineering Representatives to maintain and service computer systems and/or peripherals. You should have 2 years technical training or equivalent military/industrial electronics experience.

Please forward your resume or the coupon to one of the following appropriate individuals:

HEADQUARTERS
J.W. White
Honeywell
MSY- 202B
200 Smith Street MS/425
Waltham, MA 02154

SOUTHERN
J.L. McGuire
Honeywell
MSY- 202B
6 West Druid Hills Dr. NE
Atlanta, GA 30329

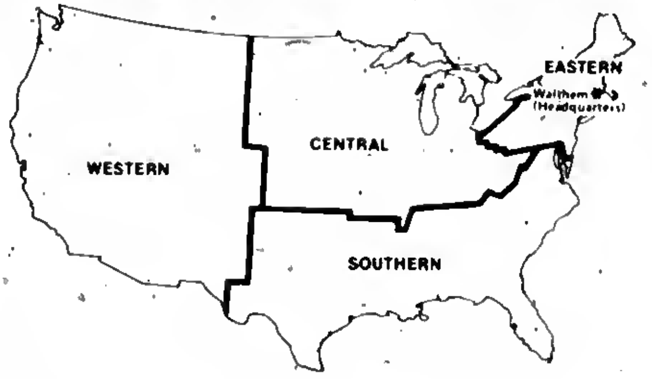
CENTRAL
R.A. Moore
Honeywell
MSY- 202B
4849 North Scott Street
Schiller Park, IL 60176

EASTERN
R.L. Potter
Honeywell
MSY- 202B
300 East 42nd Street
New York, NY 10017

WESTERN
R.J. Beaugrend
Honeywell
MSY- 202B
5959 West Century Blvd.
Los Angeles, CA 90045

FEDERAL SYSTEMS
G.W. Hess
Honeywell
MSY- 202B
7900 Westpark Drive
McLean, Virginia 22101

Openings exist throughout the United States including, but not limited to the following locations: SOUTHERN: — Atlanta, Birmingham, New Orleans, Tampa, Orlando, Miami, Richmond, Norfolk, Roanoke, Dallas, Houston, Greensboro, Charlotte, Greenville, San Juan, McLean, and Baltimore — CENTRAL — Milwaukee, Madison, Springfield, Peoria, Omaha, Kansas City, Mo., Toledo, Cincinnati, Columbus, Grand Rapids, Louisville, and Indianapolis — EASTERN — New York, Boston, Philadelphia, Pittsburgh, Cleveland, Hartford, and Buffalo — WESTERN — Seattle, San Francisco, Los Angeles, Denver, Phoenix, Portland and Albuquerque — FEDERAL SYSTEMS — Phoenix, Minneapolis, Omaha, Baltimore, Atlantic City, and Washington, D.C. — HEADQUARTERS — Boston/Waltham



02A
NAME ____________
TITLE ____________
ADDRESS ____________
CITY ________ STATE ________ ZIP CODE ________
PHONE ____________
AREAS & YEARS OF EXPERIENCE ____________
POSITION(S) OF INTEREST ____________

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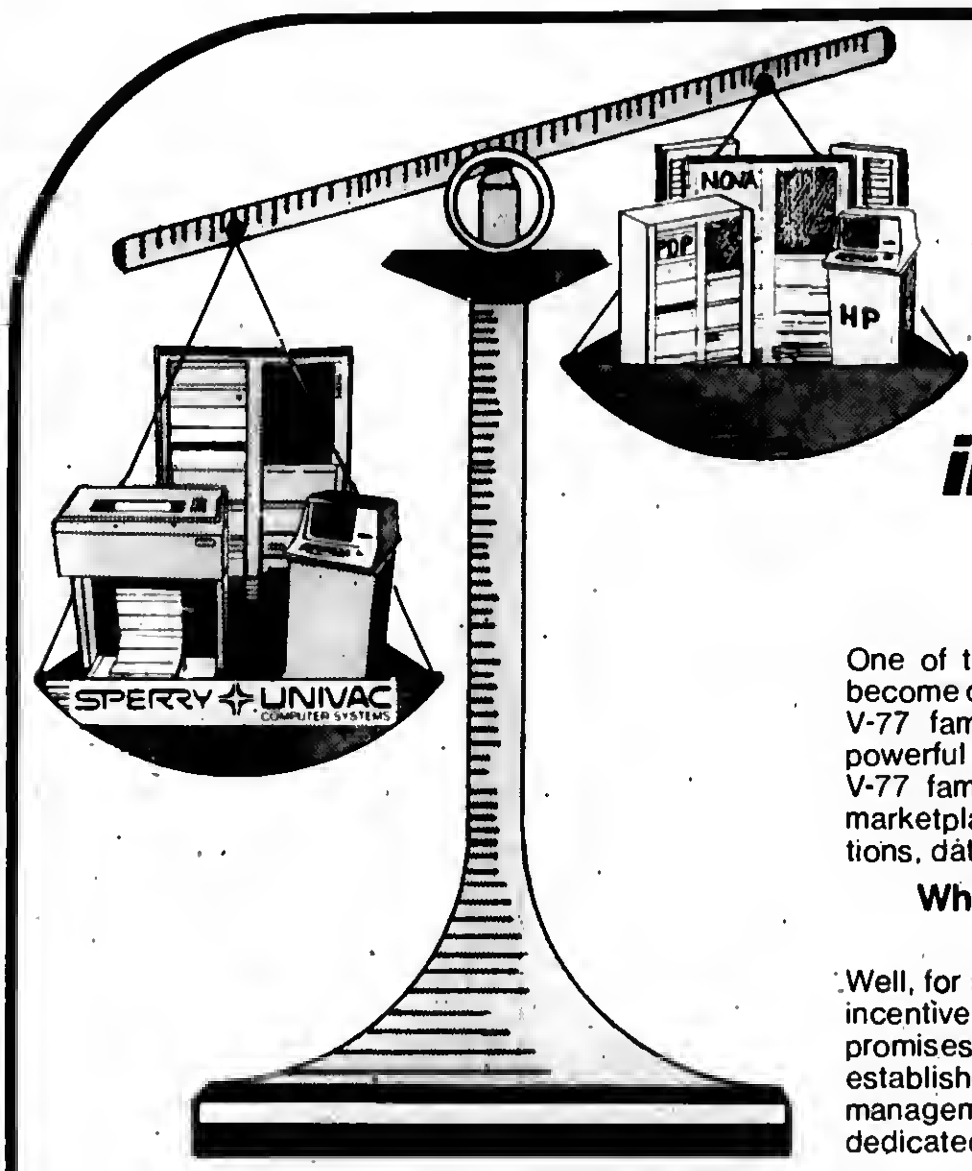

sales engineers

The odds are in your favor with Sperry Univac!

One of the biggest names in big computers has recently become one of the biggest names in small computers with the V-77 family of high performance mini-computers, a fast, powerful trio that relate to most mainframes. Specifically, the V-77 family is directed to applications in the commercial marketplace and include process control, data communications, data base and distributed processing systems.

What can Sperry Univac offer you that DEC, Data General, HP or GA can't?

Well, for starters, we feel we have one of the industry's best incentive plans, and second, real career opportunities - not promises! The goal to double in size within the year has been established and this means that both short and long term management opportunities are available for hard working, dedicated professionals.

What do we expect from you?

A minimum of 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed Processing marketplace AND technical competence in hardware and software; plus a record as a closer who maintains account relationships and gets new and repeat business.

If you're experienced in selling the Nova, Eclipse, the Naked Mini, PDP's HP or GA's-SPC, the odds are in your favor with Sperry Univac.

For openings in: Chicago, Dayton, Detroit, Philadelphia, New Jersey, New York (Manhattan), Atlanta, Orlando and Washington, D.C. please call Gerry Goerlitz collect at 215/542-5254 or send your resume to B301M, P.O. Box 500, Blue Bell, Pa. 19422.

For openings in Dallas, Houston, Los Angeles, San Francisco or Seattle please call Gary Montgomery, collect at 714/833-2400 or send your resume to 2722 Michelson Drive, Irvine, Ca. 92713.

SPERRY UNIVAC
COMPUTER SYSTEMS

To investigate other openings with Sperry Univac, please direct your resume to P.O. Box C19504, Irvine, Ca. 92713.

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FIELD SERVICE

SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
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HEAD OF DATA PROCESSING

Mississippi State University is seeking candidates for the position of Head of the Data Processing Department. Position responsibilities include management of data processing activities, coordination with user and computer operations personnel, leadership in systems development and long-range planning, and supervision of approximately 30 employees.

Computer support for data processing is provided on a dual-processor Univac 1108 which also supports education and research.

Applicants must meet the following requirements: bachelor's degree, minimum; managerial, system planning, and programmer/analyst experience in data processing using medium to large computers; demonstrated state-of-the-art knowledge of data processing methodology.

Salary open. Send resume to:

Fred Davis, Director
Div. of Numerical Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

MSU is an Affirmative Action/ Equal Opportunity Employer

MANAGER, ADMINISTRATIVE SYSTEMS

Major responsibility for managing and directing the Administrative Systems section at Idaho State University's Computer Service Center. Masters degree or suitable experience in computer science or related field, plus a minimum of four years work experience in computing and information systems, preferably at a university. Resume should include as a minimum, transcripts from post-secondary institutions, employment history and salaries, plus a summary of the applicant's qualifications. Idaho State offers the successful candidate a challenging, state of the art environment including IBM 370 batch and minicomputer-based on-line technologies. Appointment to be effective Nov. 1, 1977. Send resume no later than Oct. 7, 1977 to:

Norman A. Wismer, Director
Computer Service Center
Idaho State University
Pocatello, ID 83209

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Capex Corporation develops and markets systems software for IBM OS, OS/VS, MVS. Due to expanding sales, technical sales positions now exist in Atlanta, Chicago and New Jersey.

Ideal candidates for these positions will have two years COBOL programming experience, good communication skills and a desire to get into sales. You will have management responsibility for a large sales territory and participate in a lucrative commission plan plus salary and fringes.

If you want to apply your technical knowledge in a professional sales career, send your resume to Donald Rosner, Vice President of Marketing, 2613 N. 3rd St., Phoenix, Arizona B5004; (602) 264-7241.

Capex Corporation

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HEY!

Got boss problems?
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High visibility positions w/ rapidly expanding Boston based consulting firm. Oppty to install major mfg/fin'l systems in different EDP environments. Min 3 yrs EDP exp w/strong prog bkgd. CICS & data base a plus. Salary to $20,000 (Fee paid). Contact Jim Staunton.

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617-423-6440

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Put NEW Growth in Your Career!

If you are a restless systems engineer now working with an end user with three to five years solid experience with IBM equipment, or if you are already in sales and marketing of IBM or IBM compatible equipment, we may have just the fresh growth opportunity you seek.

Our client, a major subsidiary of a New York Stock Exchange company, offers a ground floor marketing opportunity in their New York City territory to market System 360 and System 370 computer leases as well as provide sales support to existing leasees. $30K including salary and commission.

You will report directly to the corporate VP, Marketing.

Please send your resume and salary history in confidence to:

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COMPUTERWORLD

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SYSTEMS PROGRAMMER

We are a major force in Iowa banking and have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of DOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the contentment of working in a pleasant midwestern city, please submit your resume to:

Ronald D. Long, AVP
Brenco Automation Center, Inc.
717 Mulberry, Suite 503
Des Moines, IL 50309
A subsidiary of Brenton
Banks, Inc.

APPLICATIONS PROGRAMMER

The Purdue University Administrative Data Processing Center has openings for experienced applications programmers. The computer facility is an IBM 370/148 with OS/VS1, CIC/VS, ROSCOE, and RAMIS.

Required Qualifications: Business Applications Programming Experience, ANS COBOL, OS/VS JCL.

Excellent benefit program in the environment of a large university. Please submit resume with references, salary, and work experience to:

Mr. T.L. Haworth
Personnel Services-ADMS
Purdue University
West Lafayette, IN 47907
(317) 749-6256
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EDP CAROLINAS

Progr: OS Cobol	$15,000
Prog Anal: CICS	$20,000
Software Support: OS	$23,000
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Several positions open in the above catagories. Mail confidential resume or call Joe Sawyer, The EDP Personnel Specialist, (803) 233-2546.

EXCEL PERSONNEL
1421 Laurens Rd., Suite 200A
Greenville, SC 29607

ASSISTANT DIRECTOR .SENIOR SYSTEMS PROGRAMMER

The University of Notre Dame seeks a qualified Assistant Director for Hardware/Software Systems and a Senior Systems Programmer. The Computing Center provides services for administrative, instructional and research activities of the University. The major computing environment is a 370/158 operating under MVS with heavy TSO usage. Major areas of growth are expected to be in networking and in on-line update/inquiry of data bases. Applicants should have broad computing experience including 2-5 years of systems programming. Experience in an academic institution and appropriate acaemic credentials are desirable. Salary range is 19-25K for Assistant Director end 15.5-19.5K for Senior Systems Programmer. Send resume, salary history and references to James R. Wruck, Computing Center, Notre Dame, Indiana 46556. Notre Dame is an EO/AA Employer.

Computer Architecture

Our Systems Architecture group seeks talented professionals to help design future high-performance computer systems. You should have a broad educational background in EE or CS with emphasis on computer architecture or design and be familiar with most of these areas: computer systems organization; storage systems organization; operating systems theory; assembler/high-level languages; data base fundamentals. Combined hardware and software experience and familiarity with system 370 is desirable. We have immediate openings for the following positions.

SENIOR SYSTEMS ARCHITECT

You will be a key decision maker on an architectural team. You have experience in either computer systems or operating systems architecture or design.

CONSOLE AND MAINTENANCE ARCHITECT

You will be responsible for the design of system consoles and work on system maintenance strategies. You have experience or aptitude in most of these areas: small and large computer systems; diagnostics; small operating systems and project management.

STORAGE SYSTEMS ARCHITECT

You will be key in defining the architecture of of future storage and data base sub-systems. You have experience in either of these areas.

SOFTWARE SYSTEMS ARCHITECT

You will be a software systems specialist on an architectural team. You have an architectural orientation and experience with operating systems/data base, preferably on system 370.

SYSTEMS ARCHITECT

You will be a member of an architectural team working on diverse investigations. This position offers tremendous educational and advancement opportunities. You have at least 2 years' related experience.

SYSTEM PERFORMANCE ARCHITECT

You will be the performance specialist on an architectural team. You are a qualified professional in computer system performance measurement, evaluation and modeling with emphasis on architecture or design. Research into key areas of new product development will be a major responsibility.

PERFORMANCE MEASUREMENT SPECIALIST

You will be responsible for the development of measurement methodologies to provide the measurement support of future product development. The position requires broad experience and knowledge of computer system operation, measurement methods and system modeling.

WORKLOAD SPECIALIST

You will be responsible for research of computer system workload classification and analysis, including workload creation and synthesis. Research ability in the areas of performance measurement and evaluation is necessary.

We're looking for exceptional talent. You can expect an exceptional compensation and benefits package. Please direct your response to Manager, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. To expedite your application, please indicate 416-E on your resume or letter. We are, of course, an equal opportunity employer.

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SENIOR SYSTEMS PROGRAMMER

Southern Florida financial institution requires SENIOR SYSTEMS PROGRAMMER with indepth knowledge of NCR 300 and B-4 operating system. Supervise staff of three, provide technical advice and operating standards. All interview and relocation expenses paid.

Send resume and salary requirements. Agencies invited to submit candidates.

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Newton, Mass. 02160
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Principal Anal-DEC 10/11 other mini OK Spvse 3 to 7 P/L digital applications — $30-35K
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Software Support-HASP inter JES 2 MVS — $25K
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BAL OS-learn IMS CICS degree — $19.5K
Programmer -ALP OS On line TCS — $19K
Programmer OS 370 Interactive system — $19K
Mgmt Sci-Conn loc or mgt sci degr — $19K

Bill Borrelli (212) 349-3610
William Harris Assoc.
150 B'way agency NY 10038

PROGRAMMER/ANALYST

Newspaper group has an immediate opening for an individual with knowledge of DEC PDP-11 with RSTS operating system. Will be responsible for development, installation and maintenance of business systems in the BASIC PLUS, BASIC PLUS 2 and RPG programming languages at local newspaper sites.

An unusual opportunity for the right individual to advance the state of the art in on-line interactive business applications. Excellent growth potential, competitive salary and fringe benefits. Some travel necessary. All replies will be held in strict confidence. Send resume and salary requirements to:

CW Box 3162
797 Washington St.
Newton, Mass. 02160

DIGITAL SYSTEMS ENGINEERS.

Career opportunities for Digital Systems Engineers are available with Aramco in Saudi Arabia. Aramco, the world's largest oil producing company, has several multibillion dollar projects under way, and if you're qualified, is willing to pay you well for your talents.

Besides one of the best benefits packages in the industry, you can expect your net take-home pay in Saudi Arabia to be approximately equal to your gross pay in the U.S. Advancement opportunites are excellent.

The job.

You will be responsible for maintaining minicomputer systems used for process control, power dispatching, and other sensor-based applications.

It is required that you be familiar with state-of-the-art design practice for logic circuits such as TTL and CMOS, A/D and D/A converters, core and semiconductor memories, bulk storage devices, and CRT consoles.

You should also have experience in assembly and machine languages, programming and diagnostic fault-finding techniques.

You must be willing and capable of performing hands-on system troubleshooting and maintenance as well as supervising technicians.

You are required to have an engineering degree in an appropriate discipline and a minimum of 5 years' experience in minicomputer systems.

Work schedules.

Successful applicants may be requested to relocate permanently in Saudi Arabia and work a regular work schedule, or work a special "42-21" schedule in which you work 42 consecutive days in Saudi Arabia then have 21 consecutive days off for repatriation to the U.S. with round trip air travel provided. (You would work a 60-hour week with guaranteed overtime pay—something you might not ordinarily get in the States.) Persons working the "42-21" schedule also receive free room and board while in Saudi Arabia.

Other benefits Aramco offers.

Medical care for you and your family is furnished at no charge by the company while you are in Saudi Arabia. On the average of every 12½ months, persons working a regular work schedule will receive 40 days' paid vacation plus round trip air fare to the U.S. for themselves and their families. And to this time off, add another 12 paid holidays each year.

Aramco also offers you good savings and retirement plans. And in addition to your salary, you receive a generous, tax-protected expatriate premium.

Want to know more?

If you're qualified and want more information, write for an application. We will be back in touch with you as soon as possible.

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SERVICES COMPANY
WRITE DEPT. CW0926A, 1100 MILAM BUILDING, HOUSTON, TEXAS 77002

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DP MANAGER

Irvine based food supplement manufacturer seeks an individual who will be responsible for the operation of the DP Department. Position reports to the Vice President of Finance. Specific responsibilities to include system development, programming, machine operation of an IBM System 3/Model 15 environment and training of supporting staff. Successful candidate will have experience with IBM System 3/Model 15, RPG-II, and CCP. Experience with computerized manufacturing control systems including forecasting will be helpful. Please send resume and salary history to Vice President-Finance, P.O. Box 16307; Irvine, California 92713.

Software Engineers

As one of the most dynamic and rapidly expanding companies in the computer industry, Amdahl still has excellent opportunities to offer good people who are ready to upgrade their career and work environment.

You will be working on a very large mini-based control system. You should have 1 to 2 years' programming experience with mini-based operating systems or control systems. Your background includes some hardware experience, hopefully with large digital computers, and a BSEE or BSCS or the equivalent experience. Please indicate 436-E on your response and direct it to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

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PROGRAMMERS AND ANALYSTS

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Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

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(609) 667-4488

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Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
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RSVP SERVICES
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At least 2 years COBOL & assembler exp. IBM 370 models. 155/58 in OS-HASP environment. Also opptys for expd RPG II/ANS COBOL programmers.

Excellent salary & benefits with exciting opptys for personal & professional growth. Please send resume in confidence to:

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PROFESSIONAL SEARCH PERSONNEL, MIS-EDP Dept, 4900 Leesburg Pk, Alex., VA 22302 (703) 671-0010. No contracts. No fees to you.

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Experienced on B3500, B4700 and related peripherals. Terminals. Positions available in Florida. Send resumes to:

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Yale University
Data Processing Openings

SENIOR APPLICATIONS PROGRAMMER/ANALYST

Requires a minimum of 5 years Data Processing experience with large file application (3 years' programming and 2 years' systems design). Should possess strong analytic and communicative skills. Experience in all phases of systems analysis required. Background in accounting, finance, or economics desirable. IBM, ANS-COBOL, batch and on-line applications environment.

SENIOR SOFTWARE SYSTEMS PROGRAMMER

Minimum of 4 years experience with operating systems internals. Preferred areas would include the proven ability to understand, modify, or rewrite portions of an operating system. OS/360 MVT, HASP experience would be of primary value. CP/67 desirable. Knowledge of various access methods and teleprocessing functions are a prime requirement.

Positions offer excellent starting salaries based on qualifications and background. Liberal fringe benefit program including contributory comprehensive group practice health insurance plan for employee and dependents, life insurance, 12 holidays, 1 month's vacation, employer paid pension plan, university facilities and programs.

Send resume and salary history to:

Mr. B.J. Hayden, Director
Administrative Data Systems
155 Whitney Ave, New Haven, Conn. 06520
Yale University is an Affirmative Action Employer
All interested persons are encouraged to apply

Systems Programmer

Challenging career opportunity in our Office of Management Information Services, to help generate and maintain system control program and associated software. We offer a Modern Facility using an IBM 370-148 operating under OS/VS-1 and IMS/VS in batch and teleprocessing modes with expected growth into distributed processing and mini computers. Duties also include trouble shooting software problems and assisting application project teams during systems development. Requires a Bachelor's Degree and three years of experience in general purpose software programming system maintenance. Equivalent combination considered.

Salary range $18,767-$24,878, dependent upon qualifications. Excellent benefits program, including medical and dental insurance, three weeks annual leave, three weeks sick leave, paid overtime, retirement, and free parking. Please send resume, with salary requirements, in confidence to:

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Personnel Office, Room 330
100 Maryland Avenue
Rockville, MD 20850

ENJOY A CHALLENGE?

For those willing to accept the challenge, our opportunities are UNLIMITED. At a rate of over 40%, our growth matches our opportunities. It is time to join our dynamic, success-oriented team. We have entry-level engineering openings and in addition we are looking for degreed individuals in the following areas.

Systems Programming

Senior Systems Programmers

Minimum of six years in software development. Work requires a high degree of creative ability and programming skill as well as the ability to act as a project leader. Communications experience and advanced degree desired.

Systems Programmers

Minimum of three years experience in software or system design and development. Activities include development and maintenance of new product line.

Programmers

Performs software function in the development of new products. Requires a high degree of creative ability and programming skill. Typically one year minimum experience with I/O and basic development software desirable.

Engineering

CPU/Logic Design

Minimum of three years experience in logic design. Will provide logic and systems design of minicomputer central processing units.

Power Supply Design

Requires six years experience in power supply and/or analog feedback circuits. Strong analog background required.

Continuation Engineer

Minimum of six years related engineering experience with familiarity in minicomputers and ability to perform complex system-level problem analysis.

Components Engineer

BSEE and 3+ years experience necessary in the evaluation and selection of components. Will assist engineers in component searches.

Applications

Applications Manager

Minimum of 3 to 5 years experience in digital and analog electronics with 1 to 2 years management experience. Will manage a technical support group for pre and post sales activity.

Senior Applications Specialist

Software / Systems

Minimum of eight years diverse applications experience with one year field exposure and 3 to 5 years machine language programming experience. Will provide in-depth applications support.

Sales Support Analyst

Requires degree and 2 to 7 years experience, some field exposure/applications experience and general knowledge of hardware and software. Will act as technical liaison between Field Sales Organization and Engineering and Marketing departments.

Instructors

Requires 3 years experience in Real Time digital systems with teaching experience. Will be responsible for the preparation and presentation of courses.

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Sales
Systems

Both of them. At Data General Sales Engineers and Systems Engineers work hand in glove on every sale.

Together they find the customers, create the systems and do the selling. Both meet with customers. Both present the system they feel meets the specific application. And both provide the technical information to back it up.

This kind of dual capability has helped Data General increase sales from $1 million to over $177 million in 9 years.

What's more Data General has sold and installed over 39,000 computers in 33 countries around the world. And all that money coming in has resulted in a great deal of money going out—to our Sales and Systems Engineers.

Computer Sales Engineers

We require a solid technical background in mainframes, minis or systems—plus the ability to open up new OEM and end user accounts is a must. BSEE with a successful track record in computer hardware sales required.

Computer Systems Engineers

You will use your technical expertise to provide pre- and post-sale software support to our customers and Sales Engineers. You should have minicomputer systems programming experience plus a thorough knowledge of disc-based operating systems in a multi-terminal real-time environment. BS in Computer Science with three plus years experience on Data General NOVA® or ECLIPSE® based systems is desirable.

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MIDWEST REGION

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Pittsburgh
Toledo
Minneapolis
Des Moines
Omaha
Indianapolis
Dayton
Peoria
Kansas City
Detroit

To apply for a position in any of the above locations call Yvette Britt collect at (312) 885-0505, or send your resume, including salary history, in confidence to her at Data General Corp., 1111 Plaza Drive, Schaumburg, IL 60172.

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Southern California
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To apply for a position in any of the above locations call John Bennett at (800) 225-7347, or send your resume, including salary history, in confidence to him at Data General Corp., 2221 Rosecrans Ave., Suite 204, El Segundo, CA 90245.

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San Francisco
Palo Alto

To apply for a position in any of the above locations call Terri Johnson at (415) 321-8010, or send your resume, including salary history, in confidence to her at Data General Corp., 2445 Faber Place, Palo Alto, CA. 94303.

CANADA

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Vancouver
Edmonton
Ottawa
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To apply for a position in any of the above locations call Dale Malpass collect at (416) 259-4271, or send your resume, including salary history in confidence to her at Data General (Canada) Ltd., 415 Horner Rd., Toronto, Ontario M8W 4W3.

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COMPUTER MAINTENANCE TECHNICIANS.

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You would be responsible for the maintenance of real-time minicomputers and peripherals. A solid background in electronics is required, plus training and experience on minicomputer mainframes and peripherals. Peripherals include typers, line printers, ISC drives, magnetic tapes, color CRT consoles, and process interface units.

We have SCADA systems using large numbers of RTV's at remote installations. The job includes diagnostic troubleshooting at the system level, detailed troubleshooting and repairs on specific items, plus routine maintenance and calibration of electromechanical peripherals, RTV's and process interface units.

You must be a high school graduate and have a minimum of 5 years' related experience.

Work schedules.

Successful applicants may be requested to relocate permanently in Saudi Arabia and work a regular work schedule, or work a special "42-21" schedule in which you work 42 consecutive days in Saudi Arabia then have 21 consecutive days off for repatriation to the U.S. with round trip air travel provided. (You would work a 60-hour week with guaranteed overtime pay—something you might not ordinarily get in the States.) Persons working the "42-21" schedule also receive free room and board while in Saudi Arabia.

Other benefits Aramco offers.

Medical care for you and your family is furnished at no charge by the company while you are in Saudi Arabia. On the average of every 12½ months, persons working a regular work schedule will receive 40 days' paid vacation plus round trip air fare to the U. S. for themselves and their families. And to this time off, add another 12 paid holidays each year.

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PROGRAMMER/ANALYSTS

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Candidates selected should have a creative and dedicated approach to individual life processing in incorporating new life, annuity and health marketing aids, implementing new ideas and technology, supporting the overall claims the policy holder serivce, as well as day to day production responsibilities. ALIS experience preferable.

In another area of expansion, we seek an Issue Specialist who will be responsible for meeting the information and processing needs of individual life processing. Another position is also available for a Group Specialist to design and implement a consolidated group processing system for both life and disability income; this requires solid group experience; on-line experience and data base design experience a plus.

Salaries for these positions are excellent, based on experience, plus first class benefits package that includes tuition assistance and profit sharing programs. In addition, we'll relocate those selected to our headquarters outside of Detroit, easily accessible to the magnificint Michigan vacationland areas.

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Responsibilities will include systems generation and maintenance, system performance monitoring and tuning, and error identification and debugging.

The successful candidates will have extensive IMS/VS DB/DC internals experience. Working exposure with MVS. Knowledge of NCP/VTAM, 3790, and/or SMP a plus.

We offer excellent salaries, benefits and growth opportunities. Send resume including salary history in strict confidence to: J.R. Bruna, Amtrak, 955 L'Enfant Plaza SW, Washington, DC 20024.

IMS SYSTEMS PROGRAMMERS

Responsibilities will include Data Base design, data dictionary maintenance, Data Base performance monitoring and tuning, and technical support.

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Amtrak

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Our modern computer center located in Linden New Jersey is experiencing rapid expansion and currently seeks talented individuals for the following positions:

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This new position has been created to provide full systems support to operating management. Reporting directly to the Vice President, the individual we seek must have a thorough knowledge of the B-6700 Hardware and Communication equipment, plus a detailed understanding of the MCP, DMS and NDL Software. Must also be knowledgeable of on-line banking systems.

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Three to seven years COBOL experience required; Burroughs DMS II and on line banking experience highly desirable.

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Send resume including salary history and requirements in confidence to: PERSONNEL DIRECTOR.

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Software Development

Systems Programmers

Our Software Department that designs and implements compilers, operating systems, and record management systems has doubled its size in the last two years and is still expanding rapidly. Due to this extraordinary expansion, the opportunities for growth in our organization are unmatched in the industry. We have several openings for Systems Programmers at all levels.

Your ability to learn and enjoy software development in a fast changing organization is more important than your specific background. The only firm requirement is that you have at least 2 years experience in assembly language programming, and a strong desire to learn operating systems and/or compiler run time systems development. A BS or equivalent, familiarity with PDP-11, RMS-11, RSTS/E and RSX-11M, or a knowledge of BLISS would be helpful.

If you have the energy, talent, and resourcefulness to become an important contributor in this fast-paced environment, please send your resume, including salary requirements to Joe Hart, Digital Equipment Corporation, Dept. B9i9, 162 Main St., Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

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EDP SYSTEMS DEVELOPMENT

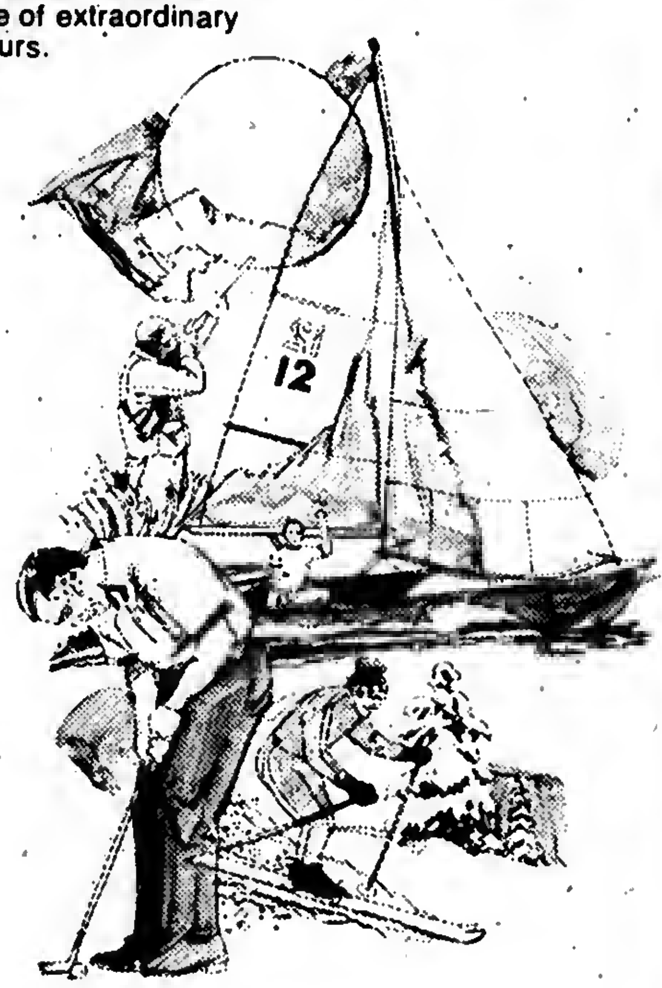
Want to combine the ideal career opportunity with your favorite lifestyle? NCR Special Systems Division needs your help now in developing advanced, high-technology EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice—beach, valley, mountain, country, small-town or urban—and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too—from mild coast to dry desert. San Diego is a place of extraordinary choices—and right now the choice is yours.

COMPUTER PROFESSIONALS

The Special Systems Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- TELECOMMUNICATIONS SOFTWARE
- FILE PROCESSING
- NETWORK DEVELOPMENT
- LARGE MAINFRAME, MINI and MICRO PROCESSOR
- OPERATING SYSTEMS
- COBOL APPLICATIONS
- ASSEMBLY LANGUAGE

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.



Our benefit package is what you would expect from a major blue chip corporation. What you might *not* expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in which every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me,

Thom Harris, Employment Specialist

NCR

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Systems Analysts/Programmers

Systems Programmers

We have immediate openings for experienced Systems Analysts/Programmers and Systems Programmers. Insurance background desirable but not essential. COBOL, PL/1 or BAL desired. Large (4 meg) 370/158-AP installation currently migrating from OS/MVT to MVS with CICS/VS and TSO. Formal career path development program with excellent promotional opportunities. Progress sharing, excellent salary and working conditions, free parking and liberal benefits.

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M.S. in Computer Science or Engineering and experience in design of software systems for real-time and interactive systems.

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Engineering System Analyst
M.S. or PhD in Math, Physics, Computer Science, or Engineering, and experience in analysis of engineering systems.

Programmers
B.S. in Computer Science, Math, Physics, or Engineering and programming experience with higher order languages such as Fortran, Pascal or PL/I. Both scientific and real-time programmers are required.

Language Processor Designers
M.S. or PhD in Computer Science and three years experience in development of programming languages, compilers, translators, assemblers and link editors.

Send your resume in confidence to
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Systems Programmers

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The Leader in Dispersed Data Processing is looking for systems programmers who are eager to accept the challenge of this fast-paced field. Due to our expanding business Datapoint Corporation has several openings in its software development operation. Applicants should have at least three years' experience in software development, together with a functional background in at least one of the following areas: operating systems, data communications and language development.

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For more information, send your resume, with salary history, to
Mr. Losan Damewood, Manager/Administration and programs. Dept. CW Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284

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Your opportunity to play a crucial role in a consulting capacity for the fastest growing, modernizing Mid-East Navy.

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18-28K

Idealistically

Candidates will possess proven and demonstrated abilities in operating systems, communications, and in language development with a 16 bit real-time processor. Along with knowledge of data base technology in such areas as view support, data semantics, query optimization, distributed data bases, and data base user interfaces. Will have consulted with product development groups, and participated in system design reviews. Responsibilities will also have included initial planning and specification of all new computer software. The individual should possess the ability to participate in establishing hardware/software tradeoffs and be able to assume complete project responsibility.

Realistically

We seek computer professionals capable of contributing to any of the above efforts in a high technology computer development firm. We offer a technically stimulating work environment along with excellent and liberal benefits, vacations and paid holidays. If you would be interested in exploring this opportunity further please call or forward resumes to:

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(617) 861-6300

861-6300

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Programmers (1-2 Yrs)	$13-16K	Software Prog (5+ yrs)	$21-27K
Prog/Analysts (2-5 yrs)	$15-21K	Mgrs, IBM S/3, RPG-II	$17-22K
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Sr. Anal/Project Mgrs	$20-25K	Mgmt. Science Analysts	$17-24K
Software Prog (2-5 yrs)	$18-23K	Scientific Programmers (mini's, etc.)	$16-23K

We offer assistance in evaluating your present position. Just send your resume and we will call you to discuss your objectives and explain how we might help you reach your goals.

FREE — EDP OPPORTUNITIES BULLETIN, a representative list of our career opportunities, mailed free of charge upon request.

For more information on our "fee-paid" placement service, send your resume to:

Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

Software Engineers

Our expanding product lines have opened several challenging positions to qualified software engineers in the following disciplines:

Project Engineer

To develop the architecture for a modular system, which also contains resident diagnostics using microprocessors. BSCS or BSEE and experience in system design. Hardware familiarity helpful.

Evaluation Engineers

To evaluate diagnostic routines for testing Microprocessor Development Aids and similar products. Minimum of BSCS or BSEE with hardware and software knowledge. Design or evaluation experience necessary.

Design Engineer

Software engineer for microprocessor system programming. Will interact with digital design engineers and operating system programmers to develop software support for a variety of microprocessors. BSCS or BSEE and familiarity with digital hardware. Extensive assembler language software experience, microprocessors or minicomputers helpful.

Diagnostic Programmer

Maintain existing diagnostic programs and work closely with digital design engineers during development cycle. Write diagnostic program for circuitry under development. BSCS or BSEE and ability to read digital schematics to the gate level. Assembler language background necessary.

Salary is open. Benefits include liberal insurance, educational support and profit sharing programs.

Send detailed resume and salary history to Mary Walhood, TEKTRONIX, INC., P.O. Box 500, C81, Beaverton, Oregon 97077.

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Tektronix
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For key research support assignments at Lederle's DEC System 10, PDP-11 installation.

If you're an innovative professional, consider the demanding assignments and solid potential for growth you can have with this leader in pharmaceutical and medical technology. You'll join the expanding staff at our Pearl River, N.Y. EDP center — located just 30 miles from New York City — and make vital contributions to programs that meet our diversified, large-scale research requirements.

The opening in our **MEDICAL DATA GROUP** is for:

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Will plan, design, and develop systems that support clinical research programs. Assignments will emphasize data base applications and user-oriented software. Requires MS in Math or Computer Science, at least 3 years experience developingand implementing computer systems, large scale data base background, and knowledge of FORTRAN and COBOL. Familiarity with SAS and INQUIRE desired.

The openings in our **LABORATORY AUTOMATION GROUP** are for:

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Will be project leader for lab engineers and computer hardware analysts. Requires MSEE and 5-10 years of experience. Also essential are knowledge of minicomputer hardware (PDP-11's), analog data reduction techniques, and computer interfaces to analytical instruments . . . familiarity with life science equipment, engineering and mathematical modeling, and communications network design.

SENIOR SYSTEMS ANALYST

Will be project leader for Systems Analyst and Analyst Programmers with technical responsibility for applications in various real time environments. Requires MS in Computer Science, Math or Life Science and 5-10 years experience. Knowledge of PDP-11 Operating Systems (RSX-11M & RT-11), and practical knowledge of MACRO-11, analog data reduction techniques, and image data processing necessary.

LABORATORY APPLICATIONS ENGINEER

Will design hardware/software sub-systems in research laboratory environment. Involvement will include hardware design, data acquisition and reduction systems. Requires BSEE with Computer Science exposure and 3-5 years experience. Knowledge of PDP-11 hardware strongly preferred.

ANALYST PROGRAMMER

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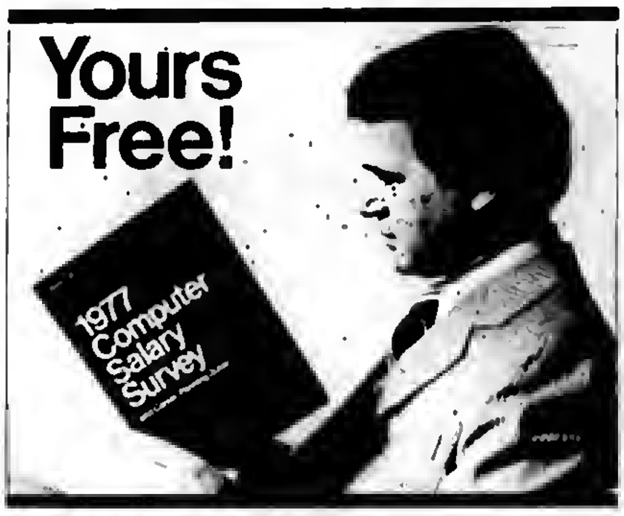

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Chief Applications Analyst

Applicants should have at least a Bachelor's Degree in the sciences and a minimum of two years of computing experience. A thorough proficiency in programming and analytical techniques must be demonstrated. The incumbent should have considerable experience in software development and usage and also provide contributory expertise in selected areas of computer applications, particularly statistics. The ability to interface with systems is desirable.

Responses to Richard Brow, Manager of User Services, by November 1.

Systems Analysts

Applicants should have an undergraduate degree, 2-4 years experience with a large scale computer facility, be competent in COBOL, and have strong oral and written communication skills. The positions require system design and analysis responsibilities for administrative applications at a major university. Data base design experience highly desirable but other candidates may be considered. The applicant should be familiar with techniques for analysis, systems design, and project planning and control.

Responses to James Carrier, Director of Administrative Computing, by October 15.

The Buffalo area offers various cultural services such as a Philharmonic Orchestra and Live Theater, plus a wide variety of winter and summer sports including excellent skiing and sailing. Successful applicants may expect highly competitive salaries and excellent fringe benefits, as well as eligibility for future tenure. Send resumes in confidence attention of the above at:

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Systems Programmers

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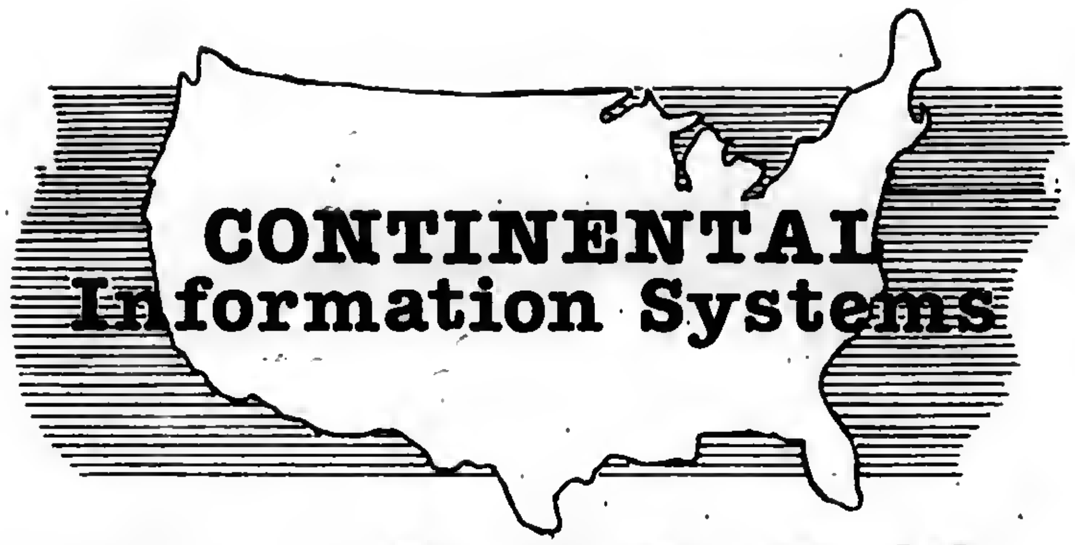

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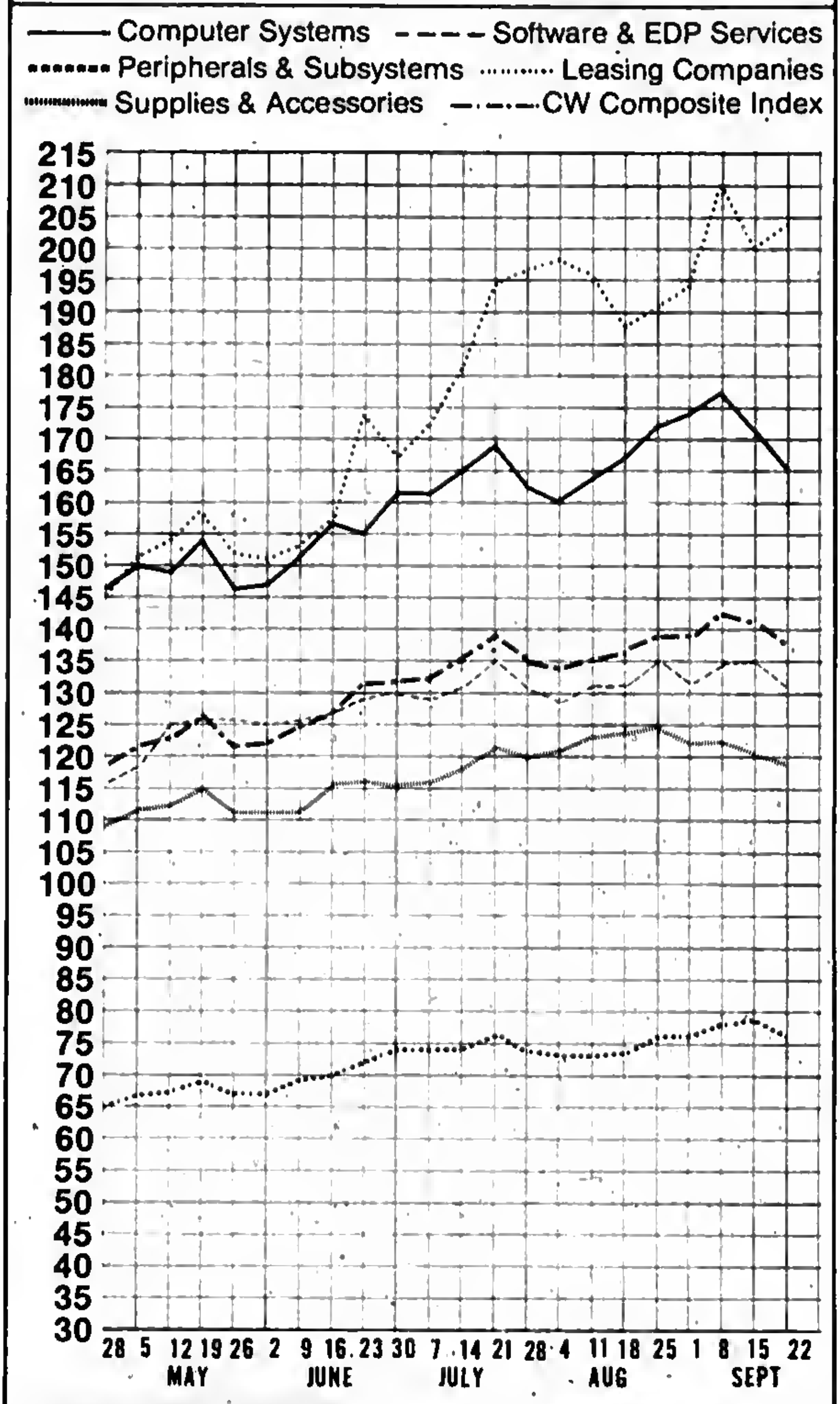

Earnings Reports

IBM
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$4.44	$3.94
Revenue	4,419,070	4,013,514
Earnings	858,329	592,808
6 Mo Shr	8.28	7.57
Revenue	8,509,365	7,828,331
Earnings	1,231,873	1,137,193

GRAHAM MAGNETICS
Year Ended June 30

	1977	1976
Shr Ernd	$1.18	$1.22
Revenue	18,438,455	18,499,705
Earnings	1,118,960	1,145,535
3 Mo Shr	.32	.42
Revenue	4,489,978	4,385,893
Earnings	305,809	394,971

GRAPHIC CONTROLS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.78	$.82
Revenue	17,034,000	14,393,000
eEarnings	975,000	1,037,000
6 Mo Shr	1.24	1.39
Revenue	33,821,000	29,243,000
eEarnings	1,578,000	1,753,000

e-Includes gains from sale of investments of $98,000 in the quarter and six months of 1977, compared with $341,000 and $362,000, respectively, in 1976.

INSTRUMENT SYSTEMS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.01	.....
Revenue	42,885,000	39,947,000
Disc Op Loss	.....	788,000
Earnings	210,000	(4,226,000)
9 Mo Rev	118,878,000	105,186,000
Disc Op Loss	.....	1,974,000
Loss	14,088,000	8,981,000

HAZELTINE
Three Months Ended June 30

	1977	1976
Shr Ernd	$.41	$2.05
Revenue	22,889,000	23,848,000
Tax Cred	.....	770,000
Earnings	830,000	4,125,000
6 Mo Shr	.78	2.45
Revenue	45,701,000	44,772,000
Tax Cred	.....	1,050,000
Earnings	1,580,000	4,905,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 21, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	38	-2	-5.0
N	BURROUGHS CORP	55- 91	67 3/8	-2 3/8	-3.4
O	COMPUTER AUTOMATION	18- 30	23 1/2	-3 3/4	-13.7
N	CONTROL DATA CORP	20- 26	19 1/2	-1	-4.8
O	CRAY RESEARCH INC	15- 29	24 1/2	-1 1/2	-5.7
N	DATA GENERAL CORP	35- 51	46 1/4	-1	-2.1
N	DATAPOINT CORP	18- 32	29 1/2	-1 3/8	-4.4
N	DIGITAL EQUIPMENT	37- 53	45 1/8	-1 1/4	-2.6
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	11	+1 1/4	+12.8
O	FOUR-PHASE SYSTEMS	13- 19	16 7/8	-1 1/2	-8.1
N	FOXBORO	42- 54	44	-2	-4.3
O	GENERAL AUTOMATION	6- 9	6 1/8	-1	-14.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	76 3/4	-1 3/4	-2.2
N	HONEYWELL INC	44- 55	44 1/2	-2 1/8	-4.5
N	IBM	245-286	256 1/4	-6 7/8	-2.6
O	MANAGEMENT ASSIST	5- 9	7 1/2	+ 1/2	+7.1
O	MEMOREX	25- 34	30 1/2	- 3/4	-2.3
O	MICRODATA CORP	7- 18	11 3/4	-1 5/8	-12.1
O	MODULAR COMPUTER SYS	5- 8	6 1/8	- 3/4	-10.9
N	NCR	32- 47	44 1/8	- 7/8	-1.9
O	PRIME COMPUTER INC	12- 23	17 3/4	-4 1/8	-18.8
N	PERKIN-ELMER	17- 22	19 1/2	- 1/2	-2.5
N	RAYTHEON CO	16- 33	29 3/4	-1 1/4	-4.0
N	SPERRY RAND	34- 42	33 1/2	-1	-2.8
O	SYCOR INC	8- 15	12 1/4	+ 5/8	+5.3
A	SYSTEMS ENG. LABS	5- 8	6 5/8	- 1/8	-1.8
A	WANG LABS.	10- 14	12 3/8	-1	-7.4

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	5	+ 1/2	+11.1
O	BOOTHE COURIER CORP	8- 10	10 1/4	- 1/2	-4.6
O	COMDISCO INC	10- 13	12 3/4	+ 3/4	+6.2
A	COMMERCE GROUP CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/8	+12.5
M	DATRONIC RENTAL	0- 2	1 1/8	+ 1/8	+12.5
A	DCL INC	1- 2	2	- 1/8	-5.8
N	DPF INC	6- 9	9	0	0.0
N	ITEL	13- 22	19 7/8	- 1/4	-1.2
N	LEASCO CORP	19- 27	22 5/8	- 7/8	-3.7
O	LEASPAC CORP	1- 2	1 3/4	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	+ 1/8	+2.2
N	U.S. LEASING	10- 15	13 1/8	- 7/8	-6.2

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 1/4	- 1/8	-1.4
A	APPLIED DATA RES.	5- 10	7 3/8	- 1/4	-3.2
N	AUTOMATIC DATA PROC	23- 30	25 1/4	- 1/2	-1.9
O	COLEMAN AMERICAN COS	2- 2	2 1/8	0	0.0
O	COMPU-SERV NETWORK	10- 15	12 1/2	+ 1/2	+4.1
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 10	9 3/4	+ 3/4	+8.3
N	COMPUTER SCIENCES	7- 9	8	- 7/8	-9.8
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	+ 1/8	+10.0
O	COMSHARE	5- 8	7 1/4	+ 1/4	+3.5
O	DATA DIMENSIONS INC	3- 5	3 3/8	0	0.0
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4	0	0.0
O	KEYDATA CORP	2- 3	2	- 3/8	-15.7
A	LOGICON	7- 17	12 1/4	- 1/4	-2.0
A	MANAGEMENT DATA	1- 2	1 1/2	- 1/2	-25.0
A	NATIONAL CSS INC	19- 26	24	0	0.0
O	NATIONAL DATA CORP	4- 7	6 1/2	- 1/4	-3.7
A	ON LINE SYSTEMS INC	16- 22	16 1/4	- 1/4	-1.5
N	PLANNING RESEARCH	3- 6	5	- 1/8	-2.4
O	PROGRAMMING & SYS	1- 1	1/4	- 1/8	-33.3
O	RAPIDATA INC	2- 3	2 1/2	- 1/8	-4.7
O	REYNOLDS & REYNOLDS	17- 20	18 3/4	- 3/4	-3.8
O	SCIENTIFIC COMPUTERS	1- 4	4 1/2	+ 1/8	+2.8
O	TYMSHARE INC	14- 23	20	- 1/4	-1.2
A	URS SYSTEMS	4- 5	4 1/4	- 1/8	-2.8
N	WYLY CORP	1- 2	3/4	-	-7.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 5/8	+ 3/8	+2.8
O	ADVANCED MEMORY SYS	7- 9	7 1/8	- 1/4	-3.3
N	AMPEX CORP	8- 11	10	- 3/8	-3.6
O	ANDERSON JACOBSON	5- 5	3 1/2	0	0.0
N	APPLIED DIG DATA SYS	10- 20	14 1/4	-3 1/8	-17.9
O	BEEHIVE INT'L	8- 12	9 1/2	- 1/4	-2.5
A	BOLT,BERANEK & NEW	7- 9	8 3/4	+1 1/4	+16.6
N	BUNKER-RAMO	8- 12	10 3/4	- 1/4	-2.2
A	CALCOMP	3- 5	3 1/8	+ 1/8	+4.1
O	CAMBRIDGE MEMORIES	1- 4	3 7/8	- 1/8	-3.1
N	CENTRONICS DATA COMP	22- 30	27 3/4	- 7/8	-3.0
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 8	6 7/8	- 3/4	-9.8
O	COMPUTER CONSOLES	4- 7	4 1/4	+ 1/8	+3.0
A	COMPUTER EQUIPMENT.	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	10 1/8	- 1/8	-1.2
N	CONRAC CORP	19- 28	21 1/2	- 1/2	-2.2
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 5/8	- 1/2	-6.1
A	DATA PRODUCTS CORP	9- 16	14 1/2	- 1/2	-3.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2 1/8	+ 1/8	+6.2
O	DECISION DATA COMPUT	2- 3	2 1/4	- 1/4	-10.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 1/8	+ 1/8	+1.7
O	DATARAM CORP	2- 8	7 1/2	- 1/4	-3.2
N	ELECTRONIC M & M	4- 5	3 3/4	- 1/8	-3.2
O	FABRI-TEK	1- 2	1 1/8	+	+5.5
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	8 1/2	- 1/4	-2.8
N	HARRIS CORP	28- 39	36 1/4	+ 1/4	+0.6
A	INCOTERM CORP	10- 15	11 1/2	- 1/2	-4.1
O	INFOREX INC	4- 7	4 3/8	0	0.0
O	INFORMATION INTL INC	9- 14	10 1/4	- 3/4	-6.8
O	INTEL CORP	38- 57	45 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	3 3/4	- 1/4	-6.2
O	MSI DATA CORP	6- 12	11 1/4	+ 1/8	+1.1
N	MOHAWK DATA SCI	5- 8	5 1/2	- 5/8	-10.2
O	PENRIL CORP	2- 5	4	+ 1/8	+3.2
A	PERTEC CORP	7- 9	7 7/8	-1 1/4	-13.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 5/8	+ 1/8	+3.5
O	RECOGNITION EQUIP	6- 10	8	- 3/8	-4.4
O	SCAN DATA	1- 2	1 1/8	- 1/8	-13.6
O	STORAGE TECHNOLOGY	10- 17	16 7/8	+1 1/2	+9.7
O	T BAR INC	7- 13	12 3/4	- 1/8	-0.9
O	TALLY CORP.	4- 6	4 1/8	- 1/2	-10.8
A	TEC INC	7- 10	7 1/2	0	0.0
N	TEKTRONIX INC	29- 38	36	-1 1/2	-4.0
N	TELEX	2- 3	2 3/4	+ 1/8	+4.7
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 3/8	0	0.0
O	BALTIMORE BUS FORMS	2- 4	1 5/8	0	0.0
A	BARRY WRIGHT	10- 14	12 5/8	- 1/4	-1.9
O	CYBERMATICS INC	1- 1	7/8	- 1/8	-12.5
O	DUPLEX PRODUCTS INC	14- 19	17 5/8	+ 3/8	+2.1
N	ENNIS BUS. FORMS	6- 7	6 1/8	+ 1/4	+4.2
O	GRAHAM MAGNETICS	11- 17	17	+ 3/8	+2.2
O	GRAPHIC CONTROLS	14- 18	14 1/4	-1 1/4	-8.0
N	3M COMPANY	48- 56	50 1/8	- 7/8	-1.7
O	MOORE CORP LTD	26- 37	26 3/4	- 3/4	-2.7
N	NASHUA CORP	16- 28	26 3/4	+1	+3.8
O	STANDARD REGISTER	18- 25	20	0	0.0
O	TAB PRODUCTS CO	13- 19	15 3/4	- 1/4	-1.5
N	UARCO	19- 22	19 1/2	+ 1/8	+0.6
A	WABASH MAGNETICS	10- 15	11 7/8	- 3/4	-5.9
N	WALLACE BUS FORMS	17- 21	18	0	0.0

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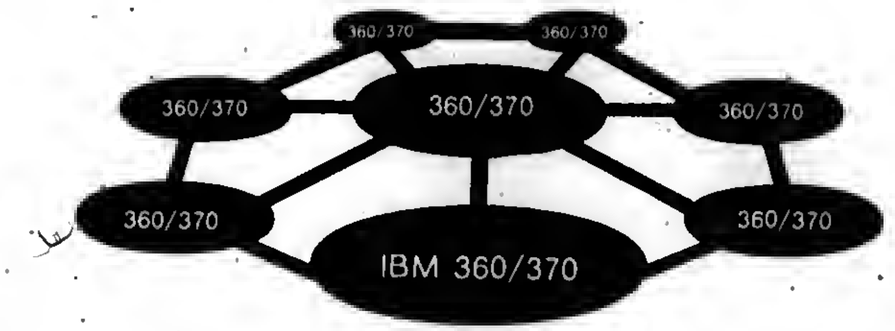

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When remote from the host, a Flexicom system provides many of the off-loading advantages of a front-end while also functioning as a powerful distributed processor. This means complete support for its own network of terminals, selective access to the host, truly distributed databases using identical host and satellite file structures, plus local batch processing on a full-feature CPU.

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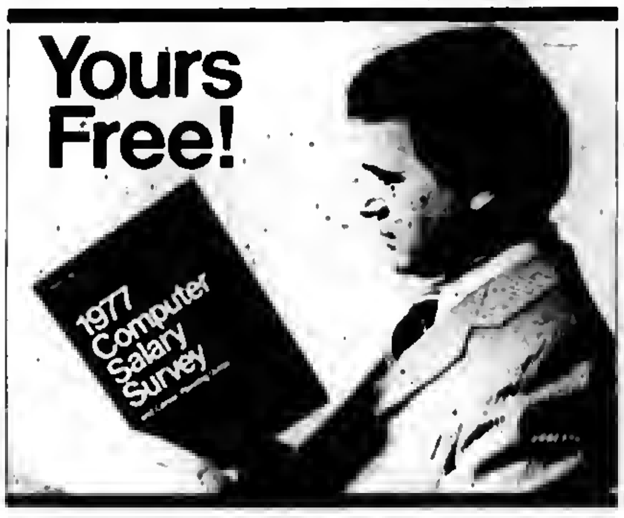

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Responsibilities will include: providing technical assistance to medical personnel to define data processing needs; use of Inquire to produce reports; and use of the Adria clinical system. Other responsibilities will include structuring an Inquire clinical data base, writing new programs to support clinical data processing and maintaining existing programs in the clinical system.

Requires minimum of 3 years data processing experience including working knowledge of Inquire. Knowledge of pharmaceutical research/clinical data processing preferred. This is an excellent opportunity to work in an environment that includes distributed processing and a large 370 computer.

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University of Cincinnati

SouthWestern Ohio Regional Computer Center (SWORCC) has several openings in EDP professionals in government contract applications.

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SWORCC has immediate openings for two Senior Systems Programmers with extensive experience in SVS/HASP systems. Experience should include generation, maintenance and modification of systems. Experience in ATS, CICS, coursewriting, or WILBUR is a definite plus. Some software monitoring and performance evaluation experience is desirable.

Excellent fringe benefit package. Resumes must contain desired salary range. Reply to Harold Crane, Personnel Manager, SWORCC, 3333 Vine Street, 5th Floor, Cincinnati, Ohio 45220.

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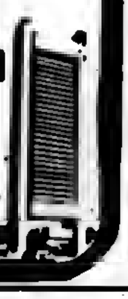
Please submit detailed resume including salary requirement to Ms. Sally Portle:



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Responses to Richard Brow, Manager of User Services, by November 1.

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Responses to James Carrier, Director of Administrative Computing, by October 15.

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Seeled proposals will be received by the CDPA, 508 Robert E. Lee Bldg. Jackson, MS 39201, up until 2:00 p.m. 10-17-77 for the following date processing equipment:

Request for Proposal No. 319 for the acquisition of a data processing facilities manegement service contrect for the State of Mississippi Centrel Oata Processing Authority

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids end proposals end to waive informalities.

Clyde F. Ballard
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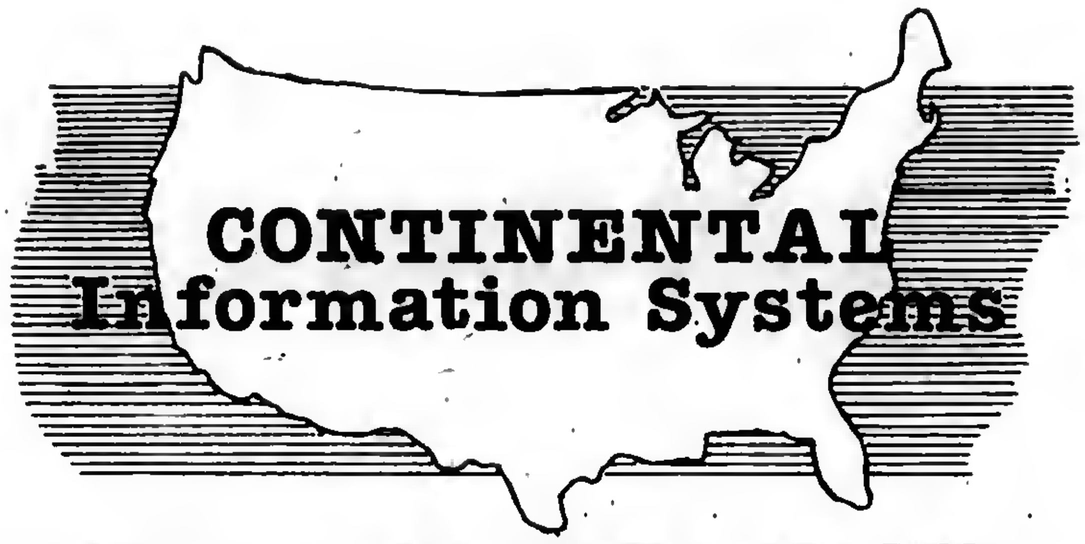

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Request for Proposal No. 313 for the acquisition of a job accounting system to operate under MVS.

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Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Clyde P. Ballard, Executive Director
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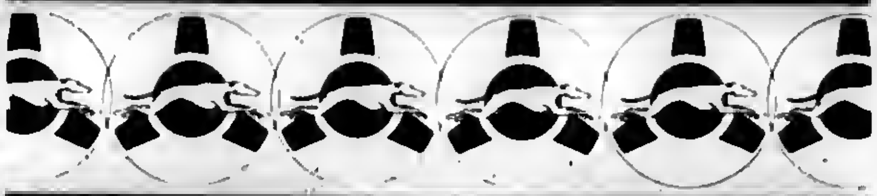

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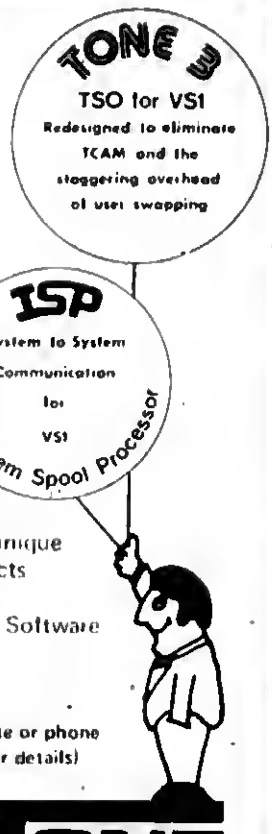
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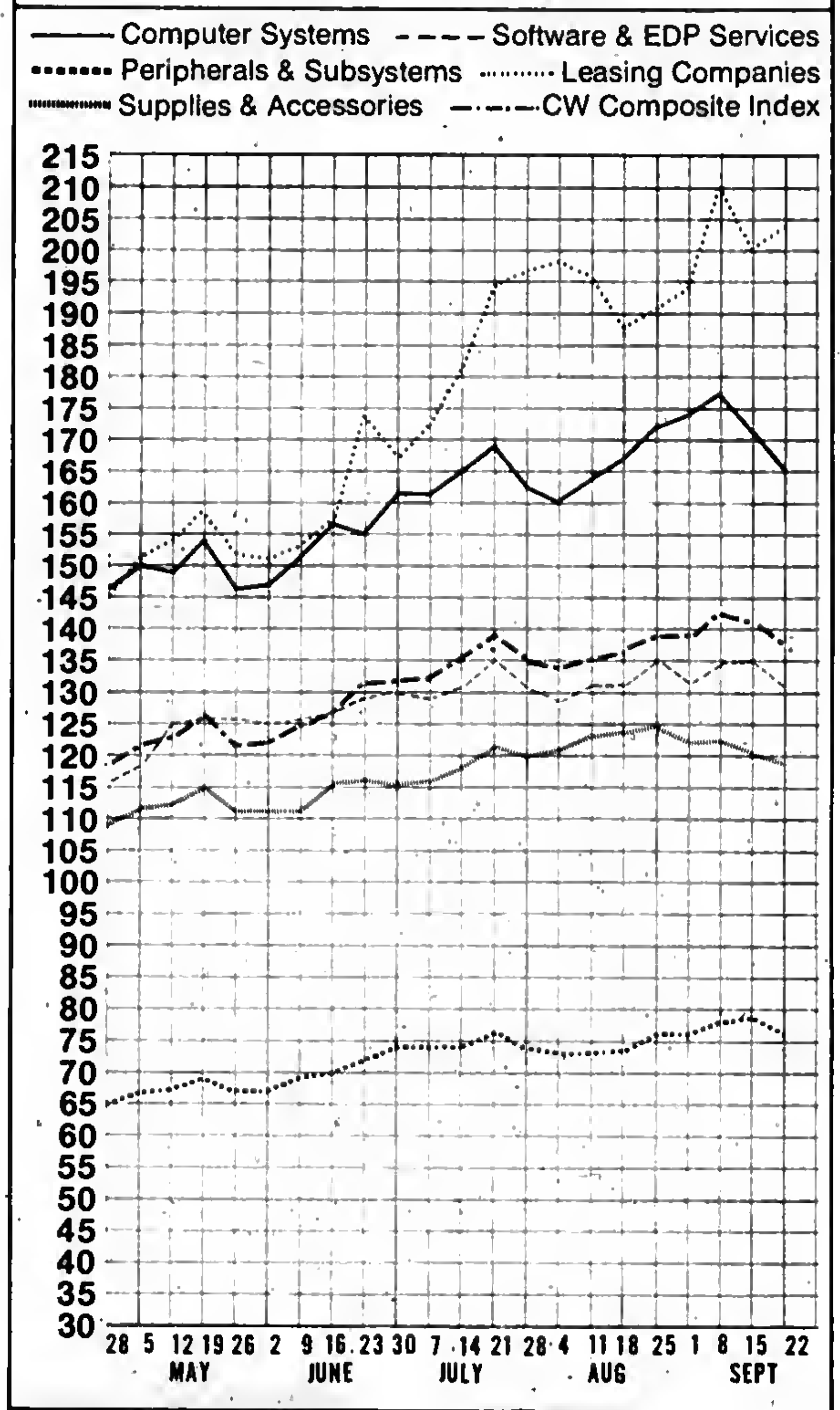

Earnings Reports

IBM

Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$4.44	$3.94
Revenue	4,419,070	4,013,514
Earnings	658,329	502,808
6 Mo Shr	8.28	7.57
Revenue	8,509,385	7,828,331
Earnings	1,231,873	1,137,193

GRAHAM MAGNETICS

Year Ended June 30

	1977	1976
Shr Ernd	$1.18	$1.22
Revenue	18,438,455	16,499,705
Earnings	1,118,960	1,145,535
3 Mo Shr	.32	.42
Revenue	4,489,978	4,385,893
Earnings	305,809	394,971

GRAPHIC CONTROLS

Three Months Ended June 30

	1977	1976
Shr Ernd	$.76	$.82
Revenue	17,034,000	14,393,000
eEarnings	975,000	1,037,000
6 Mo Shr	1.24	1.39
Revenue	33,821,000	29,243,000
aEarnings	1,578,000	1,753,000

e-includes gains from sale of investments of $98,000 in the quarter and six months of 1977, compared with $341,000 and $382,000, respectively, in 1976.

INSTRUMENT SYSTEMS

Three Months Ended June 30

	1977	1976
Shr Ernd	$.01	.....
Revenue	42,885,000	39,947,000
Disc Op Loss	.....	768,000
Earnings	210,000	(4,226,000)
9 Mo Rev	118,878,000	105,188,000
Disc Op Loss	.....	1,974,000
Loss	14,088,000	8,981,000

HAZELTINE

Three Months Ended June 30

	1077	1976
Shr Ernd	$.41	$2.05
Revenue	22,869,000	23,848,000
Tax Cred	.....	770,000
Earnings	830,000	4,125,000
6 Mo Shr	.78	2.45
Revenue	45,701,000	44,772,000
Tax Cred	.....	1,050,000
Earnings	1,580,000	4,905,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 21, 1977

All statistics compiled, computed and formatted by.
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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	38	-2	-5.0
N	BURROUGHS CORP	53- 91	67 3/8	-2 3/8	-3.4
O	COMPUTER AUTOMATION	18- 30	23 1/2	-3 3/4	-13.7
N	CONTROL DATA CORP	20- 26	19 1/2	-1	-4.8
O	CRAY RESEARCH INC	15- 29	24 1/2	-1 1/2	-5.7
N	DATA GENERAL CORP	35- 51	46 1/4	-1	-2.1
N	DATAPOINT CORP	18- 32	29 1/2	-1 3/8	-4.4
N	DIGITAL EQUIPMENT	37- 53	45 1/8	-1 1/4	-2.6
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	11	+1 1/4	+12.8
O	FOUR-PHASE SYSTEMS	13- 19	18 7/8	-1 1/2	-8.1
N	FOXBORO	42- 54	44	-2	-4.3
O	GENERAL AUTOMATION	6- 9	6 1/8	-1	-14.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	76 3/4	-1 3/4	-2.2
N	HONEYWELL INC	44- 55	44 1/2	-2 1/8	-4.5
N	IBM	243-286	256 1/4	-8 7/8	-2.6
O	MANAGEMENT ASSIST	3- 9	7 1/2	+ 1/2	+7.1
O	MEMOREX	23- 34	30 1/2	- 3/4	-2.3
O	MICRODATA CORP	7- 18	11 3/4	-1 5/8	-12.1
O	MODULAR COMPUTER SYS	3- 8	6 1/8	- 3/4	-10.9
N	NCR	32- 47	44 1/8	- 7/8	-1.9
O	PRIME COMPUTER INC	12- 23	17 3/4	-4 1/8	-18.8
N	PERKIN-ELMER	17- 22	19 1/2	- 1/2	-2.5
N	RAYTHEON CO	16- 33	29 3/4	-1 1/4	-4.0
N	SPERRY RAND	34- 42	33 1/2	-1	-2.8
O	SYCOR INC	8- 15	12 1/4	+ 5/8	+5.3
A	SYSTEMS ENG. LABS	3- 8	6 5/8	- 1/8	-1.8
A	WANG LABS.	10- 14	12 3/8	-1	-7.4

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	5	+ 1/2	+11.1
O	BOOTHE COURIER CORP	8- 10	10 1/4	- 1/2	-4.6
O	COMDISCO INC	10- 13	12 3/4	+ 3/4	+6.2
A	COMMERCE GROUP CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/8	+12.5
M	DATRONIC RENTAL	0- 2	1 1/8	+ 1/8	+12.5
A	DCL INC	1- 2	2	- 1/8	-5.8
N	DPF INC	6- 9	9	0	0.0
N	ITEL	13- 22	19 7/8	- 1/4	-1.2
N	LEASCO CORP	19- 27	22 5/8	- 7/8	-3.7
O	LEASPAC CORP	1- 2	1 3/4	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	+ 1/8	+2.2
N	U.S. LEASING	10- 15	13 1/8	- 7/8	-6.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 1/4	- 1/8	-1.4
A	APPLIED DATA RES.	5- 10	7 3/8	- 1/4	-3.2
N	AUTOMATIC DATA PROC	23- 30	25 1/4	- 1/2	-1.9
O	COLEMAN AMERICAN COS	2- 2	2 1/8	0	0.0
O	COMPU-SERV NETWORK	10- 15	12 1/2	+ 1/2	+4.1
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 10	9 3/4	+ 3/4	+8.3
N	COMPUTER SCIENCES	7- 9	8	- 7/8	-9.8
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	+ 1/8	+10.0
O	COMSHARE	3- 8	7 1/4	+ 1/4	+3.5
O	DATA DIMENSIONS INC	3- 5	3 3/8	0	0.0
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4	0	0.0
O	KEYDATA CORP	2- 3	2	- 3/8	-15.7
A	LOGICON	7- 17	12 1/4	- 1/4	-2.0
A	MANAGEMENT DATA	1- 2	1 1/2	- 1/2	-25.0
A	NATIONAL CSS INC	19- 26	24	0	0.0
O	NATIONAL DATA CORP	4- 7	6 1/2	- 1/4	-3.7
A	ON LINE SYSTEMS INC	16- 22	16 1/4	- 1/4	-1.5
N	PLANNING RESEARCH	3- 6	5	- 1/8	-2.4
O	PROGRAMMING & SYS	1- 1	1/4	- 1/8	-33.3
O	RAPIDATA INC	2- 3	2 1/2	- 1/8	-4.7
O	REYNOLDS & REYNOLD	17- 20	18 3/4	- 3/4	-3.8
O	SCIENTIFIC COMPUTERS	1- 4	4 1/2	+ 1/8	+2.8
O	TYMSHARE INC	14- 23	20	- 1/4	-1.2
A	UPS SYSTEMS	4- 5	4 1/4	- 1/8	-2.8
N	WYLY CORP	1- 2	3/4	-	-7.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 5/8	+ 3/8	+2.8
O	ADVANCED MEMORY SYS	7- 9	7 1/8	- 1/4	-3.3
N	AMPEX CORP	8- 11	10	- 3/8	-3.6
O	ANDERSON JACOBSON	3- 5	3 1/2	0	0.0
N	APPLIED DIG DATA SYS	10- 20	14 1/4	-3 1/8	-17.9
O	BEEHIVE INT'l	8- 12	9 1/2	- 1/4	-2.5
A	BOLT,BERANEK & NEW	7- 9	8 3/4	+1 1/4	+16.6
N	BUNKER-RAMO	8- 12	10 3/4	- 1/4	-2.2
A	CALCOMP	3- 5	3 1/8	+ 1/8	+4.1
O	CAMBRIDGE MEMORIES	1- 4	3 7/8	- 1/8	-3.1
N	CENTRONICS DATA COMP	22- 30	27 3/4	- 7/8	-3.0
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	3- 8	6 7/8	- 3/4	-9.8
O	COMPUTER CONSOLES	4- 7	4 1/4	+ 1/8	+3.0
A	COMPUTER EQUIPMENT.	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	10 1/8	- 1/8	-1.2
N	COMPAC CORP	19- 28	21 1/2	- 1/2	-2.2
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 5/8	- 1/2	-6.1
A	DATA PRODUCTS CORP	9- 16	14 1/2	- 1/2	-3.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2 1/8	+ 1/8	+6.2
O	DECISION DATA COMPUT	2- 3	2 1/4	- 1/4	-10.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 1/8	+ 1/8	+1.7
O	DATARAM CORP	2- 8	7 1/2	- 1/4	-3.2
N	ELECTRONIC M & M	4- 5	3 3/4	- 1/8	-3.2
O	FABRI-TEK	1- 2	1 1/8	+	+5.5
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	8 1/2	- 1/4	-2.8
N	HARRIS CORP	28- 39	36 1/4	+ 1/4	+0.6
A	INCOTERM CORP	10- 15	11 1/2	- 1/2	-4.1
O	INFOREX INC	4- 7	4 3/8	0	0.0
O	INFORMATION INTL INC	9- 14	10 1/4	- 3/4	-6.8
O	INTEL CORP	38- 57	45 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	3 3/4	- 1/4	-6.2
O	MSI DATA CORP	6- 12	11 1/4	+ 1/8	+1.1
N	MOHAWK DATA SCI	5- 8	5 1/2	- 5/8	-10.2
O	PENRIL CORP	2- 5	4	+ 1/8	+3.2
A	PERTEC CORP	7- 9	7 7/8	-1 1/4	-13.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 5/8	+ 1/8	+3.5
O	RECOGNITION EQUIP	6- 10	8	- 3/8	-4.4
O	SCAN DATA	1- 2	1 1/8	- 1/8	-13.6
O	STORAGE TECHNOLOGY	10- 17	16 7/8	+1 1/2	+9.7
O	T BAR INC	7- 13	12 3/4	- 1/8	-0.9
O	TALLY CORP.	4- 6	4 1/8	- 1/2	-10.8
A	TEC INC	7- 10	7 1/2	0	0.0
N	TEKTRONIX INC	29- 38	36	-1 1/2	-4.0
N	TELEX	2- 3	2 3/4	+ 1/8	+4.7
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE SEP 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	8 3/8	0	0.0
O	BALTIMORE BUS FORMS	2- 4	1 5/8	0	0.0
A	BARRY WRIGHT	10- 14	12 5/8	- 1/4	-1.9
O	CYBERMATICS INC	1- 1	7/8	- 1/8	-12.5
O	DUPLEX PRODUCTS INC	14- 19	17 5/8	+ 3/8	+2.1
N	ENNIS BUS. FORMS	6- 7	6 1/8	+ 1/4	+4.2
O	GRAHAM MAGNETICS	11- 17	17	+ 3/8	+2.2
O	GRAPHIC CONTROLS	14- 18	14 1/4	-1 1/4	-8.0
N	3M COMPANY	48- 56	50 1/8	- 7/8	-1.7
O	MOORE CORP LTD	26- 37	26 3/4	- 3/4	-2.7
N	NASHUA CORP	16- 28	26 3/4	+1	+3.8
O	STANDARD REGISTER	18- 25	20	0	0.0
O	TAB PRODUCTS CO	13- 19	15 3/4	- 1/4	-1.5
N	UARCO	19- 22	19 1/2	+ 1/8	+0.6
A	WABASH MAGNETICS	10- 15	11 7/8	- 3/4	-5.9
N	WALLACE BUS FORMS	17- 21	18	0	0.0

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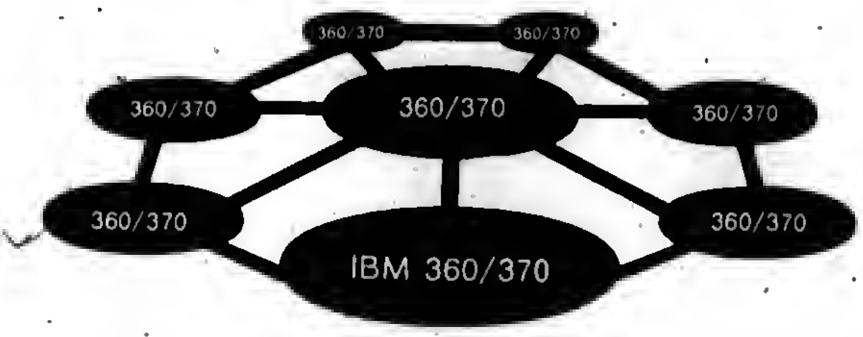

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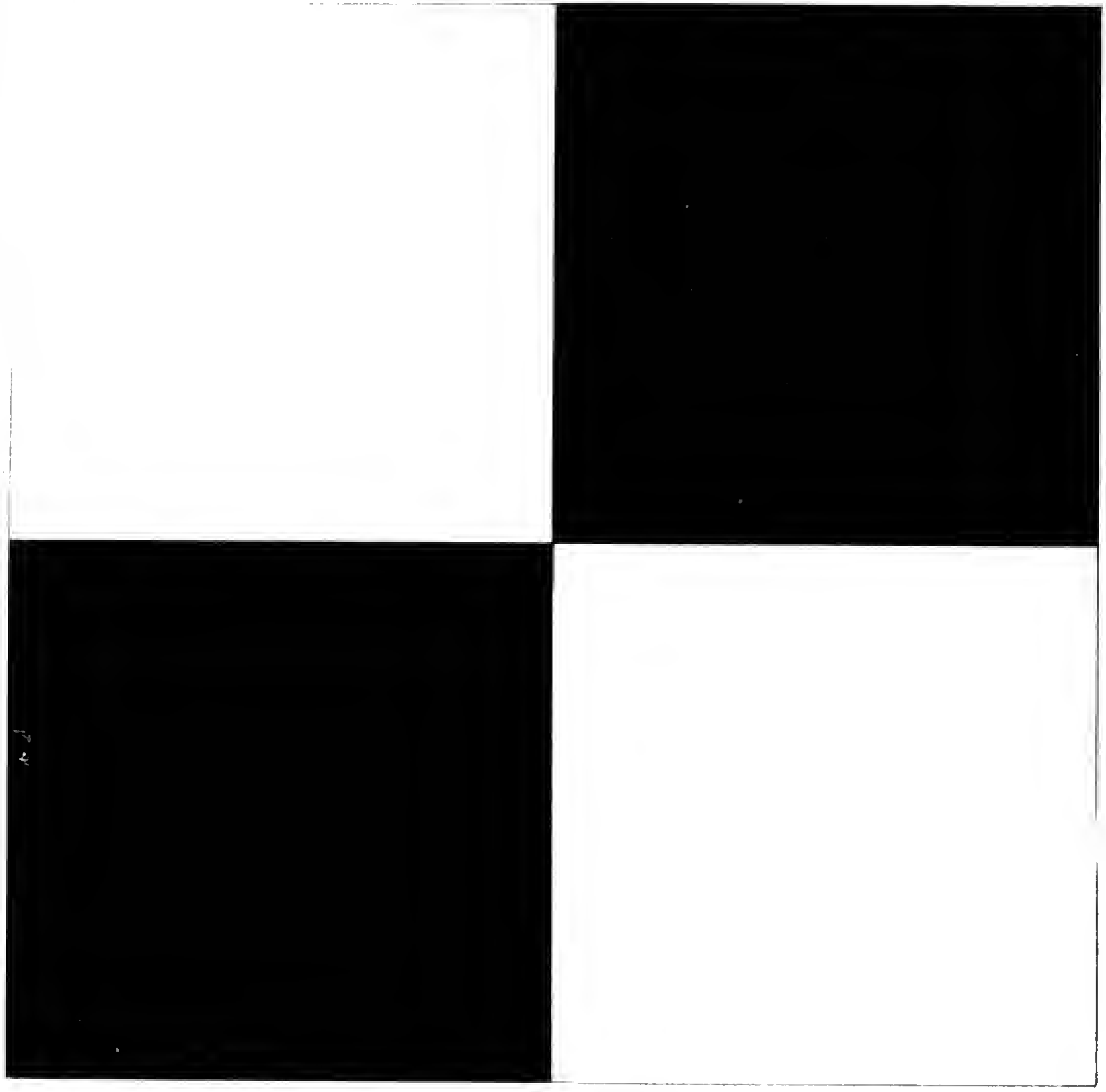
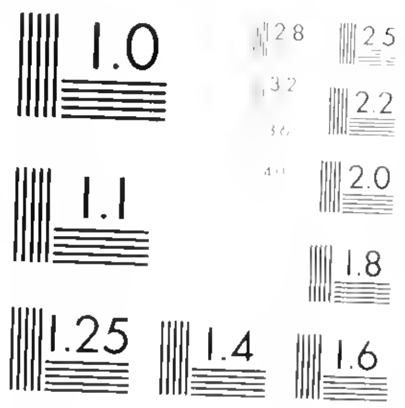


RESOLUTION CHART



MICROCOPY RESOLUTION TEST CHART
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100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and 100 20 5.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and 7.9 x 5 39.5 lines per millimeter recorded satisfactorily. 10.0 x 5 50 lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.